

Armies on Wheels

**Dr. B. R. AMBEDKAR
OPEN UNIVERSITY**

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AUTHOR: *Marshall, S. L. A.*

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THIS BOOK IS PRODUCED IN
COMPLETE CONFORMITY WITH THE
AUTHORIZED ECONOMY STANDARDS

Foreword

Seventeen years ago, when visiting the great hydro-electric works at Niagara, I was shown into the control room to find seated at a table an elderly man reading a newspaper. On the wall before him glowed many lights—the sentinels of the mighty generators below, which signalled him what they were doing or were being called upon to do.

As I gazed on him, of a sudden the vision of the future of war, crammed into an instant of time, swept across my mind. Here was the perfect general and here also was the perfect army whirling forth power. Everything was automatic except that single brain.

Unattainable though such perfection is in war, here, at least, was the goal towards which to work—Man and the Machine, not separately, but instead in intimate combination.

When thinking this out, the first thing which struck me was that the more our means of waging war are mechanized, the less mechanical must become our thoughts. Whereas the power of the machine depends upon its efficiency, the power of thought depends on its freedom—freedom not only from the mastership of the machine, but also from all and every prejudice and self-interest in ourselves. Then it appeared to me that, in order to establish a harmony between man as general and machine as army, two lines of thought must be followed—namely:

Whereas the purpose of the machine is to establish unity of action out of diversity of parts, the aim of the general is to create diversity of action out of unity of thought.

These two guiding principles I offer to the readers of this book, each one of whom, directly or indirectly, is at this moment assisting in building up his country's fighting strength, which, like an acorn, is now sprouting into an oak.

Its parts are its sea forces, its land forces, and its air forces, and in turn each of these generators of power is made up of a vast number of separate bits—battleships, cruisers, and destroyers, etc.; infantry, tanks, and artillery, etc.; bombers, fighters, and troop carriers, etc., as well as their weapons, means

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of movement and protection. Nevertheless, the whole is one vast machine in which each single bit must be related to each other bit, if the maximum output of efficiency is to be attained.

This is a stupendous problem, yet it can be solved and solved successfully, even rapidly, if design is kept simple. All frills must be cut out—they can come later. Therefore the designers must think in elemental terms. A single soldier has to guard, hit, move, and be fed. So must an army of millions of men be built up around the ideas of protection, offensive power, mobility, and supply. Further, there must be the same harmony between these four as is to be found in the single soldier. Therefore, in organization, our measuring rod is man—the most perfect of all organizations.

Given the machine-army, which should be as automatic as man can make it, we are left with man himself—its designer and its master. What of him? He is its brain, its mind. And as the brain governs the body, so must the brain of every unit govern its bit, and the brain of the General-in-Chief and his Staff govern the whole. Unity of command is, therefore, a vital principle, which though it springs from singleness of aim, depends for its fulfilment on each subordinate, right down to the private soldier, knowing the part he has to play and playing it with intelligence—that is, in a common-sense way, and common sense is *thought and action adapted to circumstances and not to rules*.

Finally we arrive at something even more necessary than the machine and the brain which governs it. This is the heart of man—his will to win, his courage to act and to endure. Here we pass from the mechanical and the intellectual spheres into the moral, in which principles cannot be defined and in which bits and parts do not exist.

What the secret on this plane is I do not know, unless it be that in war a nation must be true to itself, and its fighting men true to all that is self-sacrificing, valiant, and heroic in the history of their country, in order that the accumulated greatness of the past may direct their endeavours and lead them spiritually.

Were I an American soldier, I would seek the nobility of Robert E. Lee. Not the Lee who ordered the assault at Gettysburg, but the Lee who rode forward and met its shattered fragments, addressing to each soldier words of encouragement and comfort, and who shouldered their failure as his own. I would

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seek the imperturbability of Ulysses S. Grant, who, when he was informed during the Battle of the Wilderness of the enemy's approach and was excitedly appealed to to withdraw his headquarters, quietly replied: 'I think it would be better to order up some artillery and defend the present location.' Also would I seek the audacity of George Washington, who, when at the head of an army demoralized by retreat, an army on the point of being disbanded, whose men were in rags and whose caissons were empty, decided to cross the half-frozen Delaware in a blizzard of snow and attack at Trenton.

These things I did not find at Niagara. Yet they are the spirits which give life to the machine as described in this book, for which these poor words of mine are inscribed to do honour.

J. F. C. FULLER

Chartlands,
Limpsfield,
Surrey.

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Acknowledgement

Ives Marshall, my wife and my partner in whatever I undertake, remarked that before there could be a book on the subject which I have chosen, there would have to be an acknowledgement of my great obligation to Major-General J. F. C. Fuller, not only because he is the author of *Lectures on F. S. R. III*, which is the basic study for my writing, but because of the gracious encouragement which he has given me. No man of my relatively limited acquaintance with the methods of mechanized warfare could write copy on a parallel subject which would do credit to the military wisdom of this remarkable Englishman. He should have written the book. The best that any other may do is try to keep within the spirit of his teachings, and that I have done. General Fuller stands alone among the military prophets of our time. The one man who saw the road clearly, he is the embodiment of that rarest of combinations—the visionary theoretician and the practical fighting man—the most brilliant of the exceptions to the rule laid down by the late John Buchan that the more competent the commander, the more averse he is likely to be to the alteration of his traditional creed till its failure has been proven with utter finality.

When I first wrote General Fuller that I intended to ‘quote liberally’ from his commentary on a book of Field Service Regulations which existed only in his fertile imagination, he asked that I follow Sherman’s admonition to his bummers and ‘forage liberally’. It was not necessary. *F. S. R. III*, written in 1932, has stood the test of the terrible events of our day. It is, I believe, the most far-sighted military manual or commentary that has been written by anyone. Intended to inform Englishmen as to the nature of future war between mechanized armies, it failed of its purpose because Englishmen would not read it, though 30,000 copies were published for the Russian Army and the work was also widely circulated through the military forces of Germany. Had the proportions of democratic and totalitarian interest in *F. S. R. III* been in reverse of these results, it is conceivable that the present war would not have happened.

My thanks go also to Colonel Francis Arnoldy and Joseph

ACKNOWLEDGEMENT

Bernstein, who have provided the maps and diagrams, some of which are purely geometric and are intended to express tactical ideas rather than to portray actual operations. Others to whom I am greatly indebted are Captain Richard L. Gillespie of the United States Army who gave me valued assistance in research, and my distinguished colleague of *The Detroit News*, W. K. Kelsey, who has helped in many ways. Thanks are due also to George Allen & Unwin Ltd. for permission to quote from Alfred Vagts's *A History of Militarism*, to Sampson Low, Mars-ton & Co. for permission to quote from Rear-Admiral Alfred T. Mahan's *The Influence of Sea Power upon History*, and to Chatto & Windus for permission to quote from David Garnett's *War in the Air*.

S. L. A. M.

Detroit, Mich.

September 1941.

PART ONE

THE CAMPAIGNS



1. The Second Run

Then the Tsar addressed them and said: 'Since we have decided to fight the King of Sweden, we should agree on the method and choose the best. The Swedes are impetuous, well disciplined, trained, and skilful. Our troops do not lack in resolution, but they do not have these advantages.'

The Reveries of Marshal de Saxe

This second book on Blitzkrieg has been written because there are things which now seem well worth saying that could not be included in my first. In it the story of the war and its military lessons is carried forward. Events have moved at a lightning pace since the months of May and June, 1940, when I wrote my commentary on the Blitzkrieg in Poland, France, and Norway.¹ What has happened since has not invalidated my commentary, nor has it been disproved by the many exhaustive studies by official observers and after-the-event remarks by unofficial researchers.

However, the spectacular campaigns of the second year of the Second World War have amplified, where they have not amended, most of the major military conclusions which were to be drawn from the earlier battles. There is a vast amount of new and startling materials to draw upon, for it seems fair to say that no other year in military history compares with 1941 in the scope and variety of its operations, the absolute contrasts in the character of the decisive terrains, the numbers of new forces drawn into the conflict and the momentum of the offensives.

In this unique period, prolonged intervals of inaction and stalemate between the armies were quite suddenly dissolved by furious battle swiftly pressed to a decisive conclusion. In almost as many instances, campaigns which appeared to be on the verge of overwhelming strategic success faltered and died for no readily

¹ *Blitzkrieg*, New York, 1940. Not to be confused with *Blitzkrieg* by F. O. Miksche (Faber & Faber, London).

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discernible reasons. Horse cavalry participated in the fighting along fronts where armoured power could not make headway.¹ Anti-aircraft troops, driven from their defensive bases by enemy parachutists, the winged infantry of modern war, made their escape in the same kind of lateen-rigged fishing craft which had served the Phoenicians. There were major actions fought on mountain peaks at the Equator and over the twilit tundras within the Arctic Circle.

During this year of war, mechanized power, the new king of battles, was critically tested for the first time by the three great obstacles to the advance of all armies—'large rivers, chains of mountains and deserts, these last being the most difficult to surmount'.² With what varying fortunes it met each of these tests, we shall see. Air power, having long since claimed title to the throne, thrust forward to challenge sea power for the fight-to-a-finish, while in an ever-widening circle over the oceans, commerce raiders engaged and destroyed convoy or were themselves destroyed and blockade contended with counter-blockade for a victory by starvation.

Finally, as if to write the crashing climax to these titanic struggles, the mechanized power of Germany undertook the conquest of the most formidable of its long line of adversaries—the limitless spaces of the Russian steppes under defence by the Red Army.

In the earlier campaigns of the German Army quick victory had been assured by the narrow margins between the lines of defence and the decisive objects of attack, coupled with Germany's preponderant advantage in air power and tank power. The German armoured force which made the breach at Sedan in May 1940, could conceivably have reached Paris within forty-eight hours; the German smash from out of Bulgaria along the Strumitza River towards the Vardar Valley in April 1941, completed the decisive manœuvre in hardly more than one day.

In these operations and in the attack upon Greece, the German superiority in mechanized striking force was so overpowering that the invading army was spared even the normal vicissitudes and surprises of a military campaign. The plan predetermined

¹ There was effective use of cavalry by the Greek Army during the advance into Albania as well as by the British in the Syria campaign.

² Napoleon's Maxims.

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what should be done; it was done, and the defender was powerless to prevent it, or to modify the operation. Likewise the British tank operation against the Italian forces based on Sidi Barrani, and the subsequent Italo-German campaign across Libya in the spring of 1941 which restored the front abandoned by Marshal Graziani's army, were both models of prudent operation against an enemy hopelessly inferior in protected offensive power. One could say of these undertakings what Machiavelli said of the conquest of Italy by Charles VIII of France in 1494, that the country was conquered by a piece of chalk.

But the problem of invading the U.S.S.R. was for the German Army a full leap into the unknown. Mechanized power could be started on its way. It could be pointed towards immediate objectives for the purpose of forcing the enemy's advanced resistance line, but it could not strike forthwith towards the decisive point of attack. In its opening stages the mechanized battle between Germany and Russia in fact had the nature of an old-fashioned infantry war in that the aim was the enhancing of the offensive power of one side to the detriment of the other. The vastness of the countryside dwarfed the mightiest of the mechanized forces which moved across it. No large armoured force on either side could advance far without intense anxiety lest some more powerful body were waiting to strike at its flank^a or fall upon its support forces. This prime characteristic of the scale of the landscape profoundly influenced the nature of the battle. For the first time in this war, the German panzer forces failed in the primary purpose of mechanized attack, which is to hold the forces of the enemy.

Their headlong advance into the hostile countryside was not swift enough to thwart the withdrawal of the main body of the Red Army to its principal defensive position, nor was it flexible enough fully to choke off the lateral manœuvre of all of the defending forces whose line of retreat had been cut.

The Red Army employed its positions in the buffer area as Tsar Peter had once used a line of redoubts against Charles XII at Pultowa—to receive the shock and redistribute the force of the onslaught. Fragments of this defence in the forward zone remained as active agents after the battle. Elements of two Russian armies were trapped in the Bialystok and Minsk area by the converging movements of the mechanized pincers, but these thin

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salients of attack so far failed to complete their mission of annihilation that swarms of motorized guerrillas rolled off the flanks of the German operation and onto the German rear areas where their raiding against the invader's supply depots and lines of advance presented a problem for his supporting infantry not hitherto met in this war.¹

It was at about the time that the relationship of the space factor to armoured force operation became clear and the interdependence of infantry masses and mechanized hitting power was irrefutably established by events on the battlefield that Congressman Ross Collins, the 'outstanding military expert in Congress', laid down his barrage of magazine articles undertaking to convince his countrymen that mass is not only useless but a positive hindrance, and the army would be better advised to put all of its eggs in the basket of mechanization.

The Russo-German campaign was the first case of war between armies having every type of mechanized equipment plus motorized infantry supported by large air forces and operating against one another under such general conditions as to insure that both would undertake the war of manœuvre from the outset. It therefore merited some respectful regard even though at its beginning the 'best military minds in Washington' were quoted to the effect that only an Act of God could forestall the collapse of the Russian defence within thirty days.² Neither army came to the contest with any illusions about the permanent value of works in line. Both armies had perceived the revolutionary effect of the petrol-engine upon military organization and methods of defensive warfare, and both had rejected the dogma of the overwhelming superiority of the defensive. The Russians began the evacuation of Moscow, 300 miles distant from the enemy, while their own troops were still standing stoutly in the outworks of the Stalin Line.

Where Russian and German armies differed most radically in theories of war was in the employment of aviation in support of the land battle. The Russians believed—as did American aviation—in massed air power attacking as such and aiding their own ground forces by heavy bombardment of every consequen-

¹ Though this was the first appearance of the motorized guerrilla in operations against mechanized forces, General Fuller foresaw in 1932 that these irregular forces were destined to play an important part in tank warfare.

² The Associated Press, the 23rd of June 1941.

THE SECOND RUN

tial objective in the rear of the enemy's army. That was how the Russian air power had operated against Finland, and the theory was at least consistent with the general torpidity of the Russian air machine, though it rejected the team principle by which the Germans had scored so many cheap victories. For the Germans, in addition to providing distant support for the land offensive, gave direct support to the mechanized hitting elements during battle, functioning as a hyper-mobile artillery. The effect of the dive bomber had been devastating to Frenchmen fighting behind the armour of the Maginot Extension. It had routed the Serb defenders from the mountain passes along the Bulgarian border and so had admitted German tank power into the Vardar Valley and Salonika. Against the Russians, however, the Stuka formations were something less than the overwhelming success which they had been in previous exploits, because of the workings of the same military principle which Polybius had discovered in seeking the explanation of why the Romans had been able to defeat the Macedonian Phalanx—that concentrations of hitting power become decisive in the degree that resistance to them is likewise concentrated.

In its lesser theatres, the war year of 1941 was vastly productive of curious scenes and stirring, unparalleled situations, many of which were slighted by press and radio because of the larger interest in the great battles. Tobruk, for example, was deserving of the closest regard as the first successful modern defensive within the limits fixed by the techniques of mechanized warfare. In that area, field work and anti-aircraft defences stopped the armoured assault, and provided the pivot on which the British defence of Western Egypt turned. The tactics of the armoured force sweeps through the Libyan Desert were essentially those which Alexander the Great had employed against the Scythians—'tactical brooms moving towards a tactical dustpan'. The siege tactics with which the British defenders of Tobruk stopped the movement were the first promising sign of a future in which the pendulum will swing back to the defensive.

As the first general position ever captured by an infantry force which had been transported by air, Crete likewise was a milestone in the progress of warfare, though it was a paradox that the most dynamic offensive action of the war had a defensive purpose. For it will be remembered that the strategical signifi-

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cance of the attack on Crete was universally misinterpreted, commentators almost without exception regarding it as a stepping-stone to a similar attack upon Cyprus, which island could not have been taken by the air-borne infantry because of the prohibitive distance from the nearest base. Germany sought Crete to solidify the line of defensive bases which blocked naval power from the Aegean Sea and completed the isolation of Turkey.

In the after-light of the battle, Representative Andrew J. May, Chairman of the House Military Affairs Committee, pointed the moral that sea power had been vanquished by air power, and therefore the United States should build more bombers. Senator Pat McCarran pleaded for an independent United States air force.¹ It may have had some importance, however, that Crete was won by an infantry landed by air power on advantageous ground and lost by an infantry which had not disposed itself, fortress-fashion, over the key points within the interior of the island. Independent British air power elected not to risk the destruction of any important part of its reserve on Cretan airfields. The land forces had not established themselves according to the necessity for defending the commanding ground around the aerodromes at all costs, and after the battle began the error could not be rectified. The air strafing increased in intensity until any movement of troops became practically impossible. Almost as if it were a point of honour, the British Press stressed that 'Crete was not captured by parachutists' but by infantry landing from transport planes, a correction which points to the delinquency in the organization of the island's defence. Parachutists can descend on almost any kind of terrain but there were only three airfields on Crete where transport ships could land. The R.A.F. made the Luftwaffe a present of the air above Crete. The land forces did almost as well by the enemy with regard to the vital ground around the air bases. It is said by the British military writer Noel Monks that: 'The Germans had Maleme more heavily defended at the end of the first week than the British had in six months' occupation of the island.'² If it is true that parachutists did not decide the issue, and transport-borne German infantry did, then it is a fair presumption that the British forces might have saved the position in Crete by making the airfields

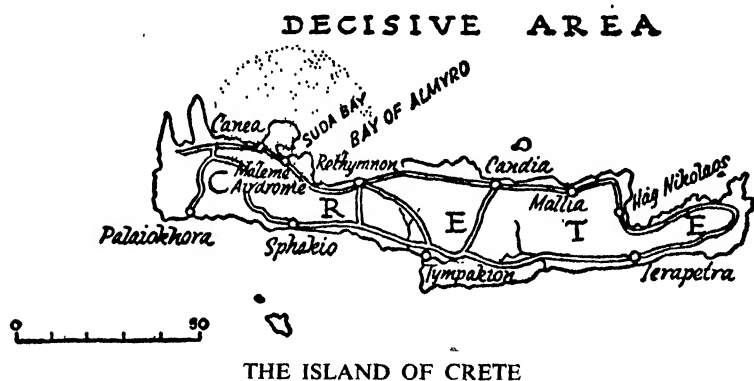
¹ The Associated Press, the 9th of June 1941.

² The London *Sphere*.

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useless to the Luftwaffe following the evacuation of their own air forces, which took place just before the invasion.

General Sir Archibald Wavell has written that the most important mental quality in generalship is what the French call *le sens du praticable* or a knowledge of what is and what is not possible.¹ It was for lack of that sense, which comes more of the imagination than of cold reason founded in experience, that the British lost the island. There was no secret weapon or new tactical principle involved. What surprised and stupefied the defender above all else was the perfection of the German ground-air radio liaison which, once established, co-ordinated the action of all



elements in the attack. Communications did it; the British were thwarted anew by German fidelity to the oldest principle in war. So Prime Minister Winston Churchill had to go before the House of Commons and explain that in future the army would be established with its own air force and that something would be done about developing better 'wireless' connection between ground and air forces.

Certain of the year's campaigns were distinguished by generalship of the highest order. Under strangely contrasting conditions, and in many hands, the mechanized forces of war proved able to stand the stresses and strains of original movements.

High on the list of things accomplished was the strategic sweep of one slender British column of mechanized and motor-

¹ General Sir Archibald Wavell, *Generals and Generalship*, (*The Times*, London, 1941).

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ized elements which impressively influenced the fortunes of two minor campaigns. Doing relatively little fighting but moving for two months almost without stop through the cruellest of desert countries, this force whipped out of Egypt to lift the siege of the British position at the Habbaniya airport in the Euphrates Valley and liquidate the ill-timed Iraq rebellion of Raschid Ali. It then turned westward into Syria, advanced past Palmyra, and was threatening the rear of the French forces retiring northward from Damascus at the hour when General Henri Dentz asked for an armistice. The effectiveness of mechanized troops in a preventive operation against irregular forces, or in any kind of frontier fighting where rapidity of movement is everything, has not been more dramatically illustrated in war.¹

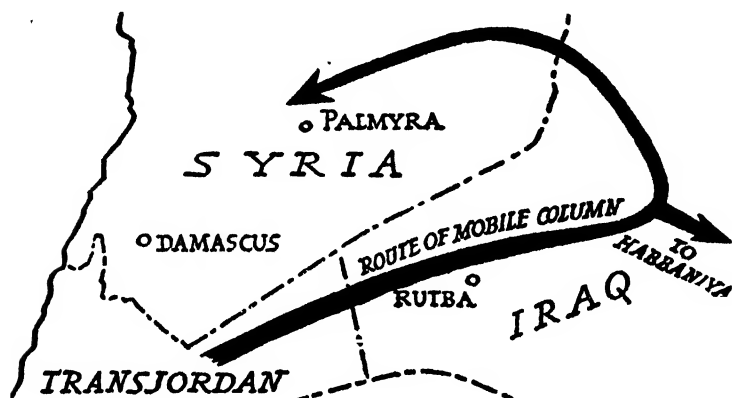
If further proof were needed, it was supplied by the British-Russian invasion of Iran in the last week of August, 1941. It was slightly ironic that the Army in India was to give the most impressive demonstration of the value of armoured force in a preventive campaign, for its leadership had railed against the principle for years, taking the obscurantist position that bullet warfare—which means untold killing—was the one humane way of dealing with native forces who had nothing but the rifle. In Britain's battle over the tank prior to the war, the Army in India was the greatest influence against innovation, and its commanders stubbornly held their ground. The success in Iran was almost embarrassing. No military campaign in history has been concluded in such fast time, and no small war of recent times has promised greater strategic gains at slight cost. The real object of campaign was, of course, the seizure of a route of supply between Britain and Russia, but as vital as was the prize, Britain hardly would have dared reach for it without tank power.

Three at least of the campaigns fought on other fronts are likely to find their way into the future book of classic battle studies. As a masterpiece of deception and mechanized tactics, the British operation against Marshal Rodolfo Graziani's army in Libya is not to be held less lightly either because it was a victory over Italians (the subject of a lament by the British critic,

¹ In this war the British Army has had its richest successes with mechanized operation in colonial and small war problems, though prior to the war the greatest resistance to mechanization in the British Army was set up by the conservatives who argued that it would never do to use tanks along the frontier.

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Captain Cyril Falls)¹ or because the subsequent Axis recovery left it strategically almost sterile. Rating as high on the honours list was the campaign by which the under-equipped but brilliantly captained Greek Army advanced into Albania to begin the most adroitly fought mountain campaign since Napoleon in Italy. It was also a deathless epic of human courage. Its failure had nothing to do with valour or the ability of troops to bear their weapons well, nor does it dim its lustre as a feat of arms. To my mind, this failure was the first grand event of the war, and



THE LONG DESERT MARCH

it won even from the German enemy the grudging tribute that 'of all our opponents, the Greek soldier fought with the greatest bravery, supreme courage and contempt of death.'² Some day a Greece made stronger than ever it has been in its past will think on these things, and write fine phrases of the dead who fell in Albania or along the edges of broken wood and in the sunken lanes of Mount Olympus and the pass at Thermopylae, but it will find no fairer tribute than ancient Rome's salute to a faithful general. Let it be said, *Because they did not despair of freedom.*

The third of these classic studies is the German operation of the 6th of April 1941, under Field-Marshal von List. As an ex-

¹ *The London Illustrated News.*

² From Hitler's speech before the Reichstag.

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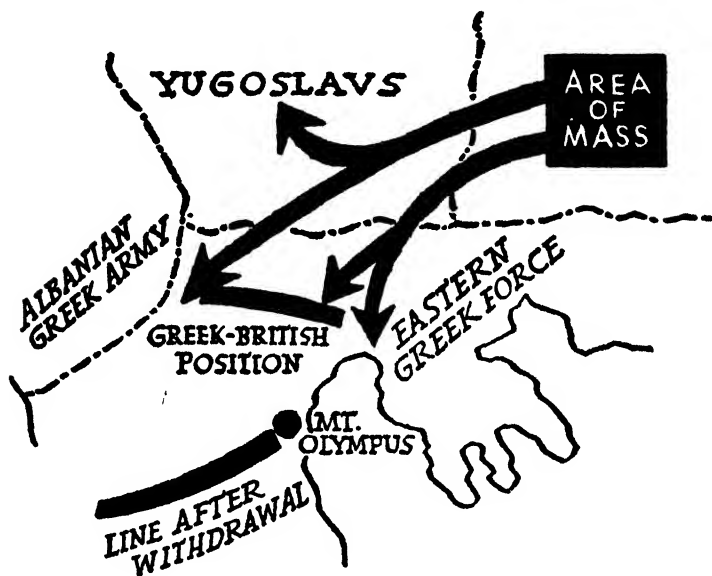
ample of the bold stroke and of audacious planning aimed at the highest stakes, the campaign is unmatched in war. The form of the battle throughout was the direct consequence of the manœuvres which the German Army had undertaken to bring it on. List's two armies reached simultaneously for Salonika and the Monastir Gap. By so doing, they forestalled possible juncture between Yugoslavia and the Allies, crushed the right wing of the Greek Army, isolated the left wing and aborted the planned defensive of the British-Greek force in the centre almost before it had made contact with the main body of the enemy.

The distribution of the German offensive forces in Bulgaria was a conspicuous case of the all-seeing perspective which Frederick the Great called the *coup d'œil* of generalship. The German command foresaw with absolute correctness that the Vardar Valley between Salonika and Skopje was the hinge by which the loose parts of the Balkan defensive held together, and that due to political circumstance, this decisive ground was the line which the Allies were least prepared to defend. Holding elsewhere along the frontier, the German Army struck its lightning blow against the south-eastern corner of Yugoslavia, with the results that the battle became an object lesson in the expenditure of military force, and the fates of both Greece and Yugoslavia were settled by the events of the first seventy-two hours of combat. When the Stuka bombers shattered the Serb positions along the heights of the Strumitza River Valley, and German mechanization broke through into the southern tip of Yugoslavia and thence by way of Lake Doiran to Salonika, the linchpin fell out of the Balkan defence. Nothing could have availed the British thereafter except command of the air above Greece, and this was not within their means. By their swift passage into the Vardar, the Germans turned the Greek-British defence into a rearguard action, and there was no further question as to the outcome except what portion of the British Expedition could be saved.

Among the other striking phenomena of this second war year was that people generally came to speak of the 'Battle of Britain' and the 'Battle of the Atlantic' as if the struggle in these sea and air theatres was as definitive and decisive as any of the mechanized campaigns by land. This sign of a wider public understanding of the nature of modern warfare was sustained when in July the occupation of Iceland as a defensive position by United

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States troops met with general understanding and approval, though it was not until that same month that Army Field Service Regulations were amended to recognize that the air was a separate sphere of action and that its weapons have the potential for decision—a somewhat belated admission, all things considered, but reflecting the natural conservatism of the service professionals.



LIST'S BALKAN OPERATION

So it is in many respects a rare body of military experience which has been provided by the year 1941. Much of the most vital information concerning it is still absent, and necessarily the co-ordination of full detail which is the soul of history will not be possible while the war continues. Whole armies still remain unaccounted for. The causes of the dissolution of entire battle-fronts are yet to be explained. In these circumstances causes are in certain local instances apt to be mistaken for effects and impulses confused with reactions. The greatest battles of the year—in fact, of this entire war—were those which were most elabo-

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rately screened from the gaze of all save the combatants. Little is known of the proportion of the moral to the material factor in the Red Army's defence of White Russia, which was the greatest testing-ground for mechanization yet uncovered. Next to nothing is known of the tactical pattern of this defence or of the rôle of anti-tank weapons therein. Once again it was war with unlimited hazard and forfeit and on an unprecedented scale but with the difference that the issues were decided not by the manœuvre and clash of tremendous bodies of armed men but in the composite of a hundred and more battles which eddied and swirled along twenty-five hundred miles of fighting line. The proportions, even the place of many of these battles, cannot be told. The official communiqués were lamentably brief and often deliberately misleading. What the correspondents wrote of the war after being officially conducted over the battlefields has slight value.

For these reasons, any book such as this one, written during the war and being a contemporary commentary upon it, is tentative in most of its judgements. For that, one need make no apology. Such a large and growingly important section of the business of making war is devoted to deception and concealment that even the most faithful of battle studies must lack something of completeness, and he who waits for all of the threads to be gathered in before starting will never sit down to write. It is the object of the search that determines the field of pursuit and the object in this instance has been adequately stated by the European critic, Max Werner: 'A history of the war written during its course, no matter how incomplete it must be, still has the chance to be of service in the struggle, to enlighten public opinion, to give a summary of experience up to this point that may be useful in the next action phase of the war.'¹

General understanding of military principles remains on relatively low ground. Much of the comment in the press and via the radio is objective and well-informed, but as a basis for directing public interest into studied judgements it is not always successful. As the past summer witnessed, there is a cleavage in the public thought concerning even such a primary and one-sided question as whether one year of basic training prepares a soldier for the realities of modern service. Under a totalitarian rule it is

¹ *Battle for the World*, New York, 1941.

THE SECOND RUN

perhaps of no great importance that the citizenry should understand what is being done by the military, and why. But in a republic military action in all of its phases, from preparation to demobilization, depends on voluntary support and co-operation. To the extent that this mood is the derivative of informed understanding rather than of blind trust and obedience, the perpetuation of a people's government is insured.

The aim here is to inquire further into the military nature of the war. There is no need to re-survey the general ground which has been so exhaustively treated in a number of competent works on the national defence problem, since the specific purpose is to illuminate certain new and relatively unconsidered aspects of defence in the light of the campaigns of 1941. Not all of the threads will be drawn together, nor should it be necessary fully to examine each in its relation to the entire fabric of our defence policy.

It is a book not of conclusions but of ideas. The war goes on. Every day one learns something new and unexpected from it, and finds it necessary to question and re-appraise what had been considered the vital and unmistakable lessons of the past.

2. *Tanks in the Desert*

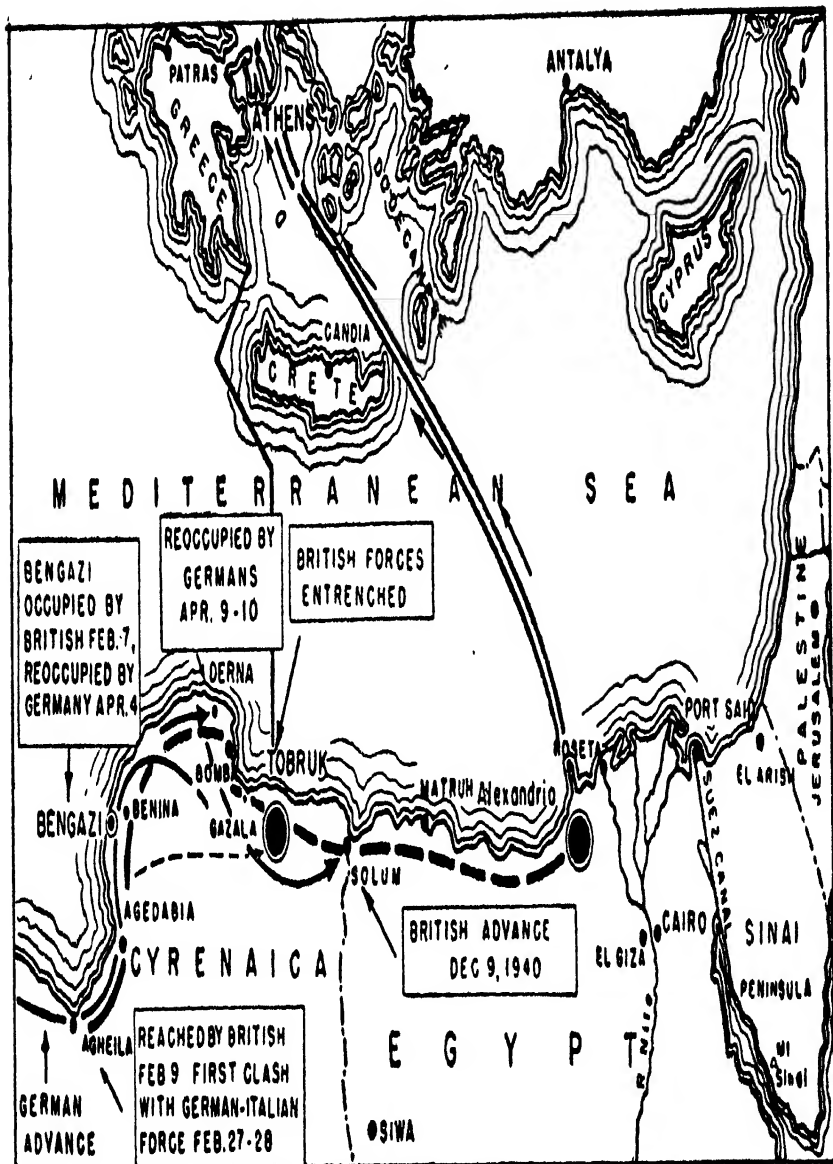
The battles of the past succeeded or failed according as they were fought in conformity with the principles of war ; and the seaman who carefully studies the causes of success or failure will not only detect and gradually assimilate these principles, but will also acquire increased aptitude in applying them to the tactical use of the ships and weapons of his own day. He will observe also that changes of tactics have taken place after changes in weapons, which necessarily is the case, but that the interval between such changes has been unduly long. This doubtless arises from the fact that an improvement of weapons is due to the energy of one or two men, while changes in tactics have to overcome the inertia of a conservative class ; but it is a great evil.

RÉAR-ADMIRAL ALFRED T. MAHAN

On the 15th of September 1940, a great concentration of Italian troops sifted through the line of small forts which guarded the Egyptian border of Libya and moved eastward along the coast. The barbed wire barrier which covered this frontier to a depth of a quarter-mile or more was parted and the armoured cars and small tanks raced forward into the van. Squadrons of Italian aeroplanes dropped their bomb-loads on mud-hut villages already abandoned by the British. The troops crossed the Solum Ridge which the British had prepared with minefields, and dropped down on to the coastal road which leads to Alexandria.

In this manner, with many trumpet flourishes and amid as much secrecy as attends a parade of circus elephants, Marshal Rodolfo Graziani and an Italian Army which placed its own strength at 200,000 men began the invasion of Egypt. No manœuvre in the history of war was ever given a better world press. None could have proved less worthy of it. In the first two days of operation, the Italian tanks rolled fifty miles from the Libyan border, meeting and defeating *en route* a light British screen of tanks and armoured cars in the sand hills near Buq Buq.

Those who from afar gazed upon this burst of offensive power were impressed chiefly by the terrific speed of the advance, and



THE LIBYA THEATRE

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they began to count on the fingers of one hand the number of days between the tanks and the Nile. Before they could recover or gain a sense of proportion as regards the nature of mechanized war in a desert country, the Italian movement dropped to snail's pace, and then stopped. Graziani reached Sidi Barrani, from which town a first-class metalled road leads to Alexandria, and there he tarried, meanwhile beseeching Rome to undertake a diversion which would draw R.A.F. fighter craft away from his front and the British Navy away from his left flank.

The British forces in Egypt likewise bided their time while their commander, General Sir Archibald Wavell, set his plans for the future. The weather was unbearably hot; the rains do not come until October. Off shore, the navy blasted away at Graziani's bases. In the air the R.A.F. gained ascendancy over such of the enemy air forces as it chanced to encounter. By land motorized patrols maintained contact with the enemy front. But the main forces of the Army of the Nile continued to enjoy the luxury of bathing at Mersa Matruh, a resort which has some special fame as the site of the villa where Cleopatra dissolved her pearls in Mairut wine to mark her pleasure with Antony. From in front of Matruh a low escarpment ran off south-westward towards the fort at Nibeiwa on which position the Italian right flank rested in the Libyan Desert. The escarpment provided a suitable line for the defending artillery which was covering the highway from Sidi Barrani, and also provided a jump-off position which the Army of the Nile would find useful in time.

Such was the broad outline of the Italian invasion, an *opéra bouffe* operation which would hardly call for detailed study in any serious commentary on war if it were not for the great events to which it gave rise. By this otherwise inconsequential fifty-mile march, a vast new theatre for mechanized operation had been opened. Towards this theatre, fresh new forces moved from Britain, Australia, South Africa, India, Italy, the Free French colonies, and finally—from Germany. Others took up the problem which Graziani had found insoluble, and they in their turn failed to master it. Libya became the graveyard for military reputations and the chief strategical enigma of the war. In two mighty offensives, eastern Libya was crossed and recrossed by lightning forces which had obtained a first purchase on sweeping success by achieving a maximum of surprise. The terrific momentum of

TANKS IN THE DESERT

these two offensives—the British advance from Matruh to the western border of Cyrenaica and the Axis counter-offensive which began at El Agheila and was halted at the Egyptian border—is a sufficient proof of the tactical ability of the striking forces and of the quality of their leadership. Yet neither operation had decisive effect. One year after Graziani's invasion the battle lines were only a pace westward from where they had been on the 15th of September 1940, and the generals on both sides seemed as loath to move as had been Graziani.

It could be said then with some accuracy that both armies had lost the desert war. Though the issues there had reacted upon operations and policies in every other theatre of the war, and Egypt's danger had alarmed the United States hardly less than the threat of invasion of the island of Britain, nothing of lasting strategical importance had been achieved directly by the Libyan fighting. Had the sector been blacked-out and declared out of bounds before one shell was fired, both sides would have been materially better off. Still seething like a volcano and threatening to erupt at any moment, the front during the summer of 1941 became a glorified proving ground for the new weapons of mechanization and for the testing of new methods of defence against them. American 'tankers' were assigned to this school in great numbers and went to the foot of the class.

To understand why these things came about, it is advisable to regard first the country, for by so doing one sees most clearly that the tank and the armoured car have not changed the principles of strategy as determined by time and space. The configuration of the earth still decides the patterns of campaigns. The ancient battlegrounds and the historic lines of advance exercise their spell as faithfully over the newest armies as they did over the army of Napoleon or over the Arab forces which advanced through Libya to move into Western Europe through Spain.

The African soil of the eastern Mediterranean coast is a stiff mixture of clay and loam which is well covered by desert scrub. About thirty miles from the sea the scrub ends, and the sand begins, at the limit of the coastal rainfall. Beyond this strip is the real desert where the sands of the Sahara form great seas of gently undulating dunes. Over these sinister and almost trackless wastes, the track-laying vehicles of a modern desert-mounted corps may safely venture on patrol, but large armies which

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would follow them are warned by the fate of the forty thousand Persians who in 500 B.C. marched from Kharga to destroy Siwa and were themselves destroyed by sand and thirst to the last man. For passage east or west over this part of Africa, even the most modern striking force must hold to the strip of coastal vegetation as a helmeted sea-diver holds to his air-pipe. The coastal roads and the firm soil afford traction for a motorized column. Only by clinging to the coasts can the fighting forces ease the problem of water supply.

For in all desert warfare, it is to be remembered, water is an army's compass and its lodestar. In other places, time is reckoned to be the most priceless of military considerations and the enemy's speed of operation is the factor which largely dominates one's own decision, but in the desert campaigns water supply and the distances between water holes have a death grip upon strategy. The desert cannot be conquered by armies because the desert is barren. Of itself, as Winston Churchill has written,¹ it yields nothing to them except hardship and suffocation. To occupy it is therefore a purposeless and wasteful proceeding unless occupation is a necessary step to the destruction of the armed forces of the enemy. It is this very singleness of purpose about desert warfare which distinguishes it from all military operation in the more hospitable terrains. The arena is suitable for nothing except the primordial combat with death or survival as the issue. All movement is limited by water supply and all manœuvre seeks to encompass the destruction of the enemy.

The constancy of this relationship between the desert water tank and the desert fighting tank needs to be kept in mind as the tale is carried forward of how mechanization fared in the desert. Protection is enormously complicated by the basic conditions of geography and climate. Their over-all effect is that the mechanized elements, despite their tactical flexibility, cannot overcome the strategical rigidity which grips the body of the army. One flank is held by the seacoast in the manner of a football line when the ball has been run almost out of bounds. Extension of the other flank is limited by the desert. With an army thus corseted, the organization of its general protection during the protracted defence becomes greatly exaggerated in depth because of the ever-present threat to main and advanced bases.

¹ *The River War.*

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Desert-going tanks may circle a flank and raid the enemy rear installations to a depth of seventy-five miles or more. Aeroplanes may strike anywhere. Security is therefore a matter of providing protection in diminishing volume all the way back to the main bases where it again becomes disproportionately strong because of the danger of an invasion from the sea.

One cannot examine this situation without becoming aware of the continuing jeopardy to all forces unless there is a maximum of mobility and of fire power in the protective elements. Let us imagine that they are given such protection in their forward zone and that the front of the army is covered by a strong infantry force fully motorized, and equipped with tank-stopping weapons. As enemy pressure develops against this front, and a general retirement becomes necessary, the mobile infantry deploys rearward echeloned in the form of a great cone with its apex pointed towards the enemy. Through this protective cone the mechanized forces move to the rear ready at the shortest notice to make the turn around the mouth of the cone and take in flank or rear any enemy forces operating against its sides. Lacking the requisite mobility in its protective wing, however, the defending tank force is almost certain to become engaged in circumstances where its distributions are vulnerable to the enemy concentrations. Disengagement then becomes almost an impossibility unless the tanks in the forward combat zone are supported by a strong mechanized reserve which can take up a position along one flank to cover the withdrawal, thus serving the general purpose of the protective anti-tank cone.

During the 1940-1 desert campaigns, the defence lacked both mobility in the protecting wing and a sufficient mechanized reserve. Though this was at the heart of the swift collapse of the defensive positions, the detail of the battle provided eloquent proof that it is easier to lose control over fast-moving machines than over slow-moving troops, and therefore an ever-present danger in mechanized war is that a sudden reverse is apt to end in a rout.¹ Gustavus Adolphus, Napoleon, Stonewall Jackson, U. S. Grant—such leaders as these were able to steady a bad battle situation by their presence and by their words. That moral influence is now missing from the battlefield though the position of the leader is more than ever at the point of advance rather

¹ Fuller's *F. S. R. III*.

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than somewhere behind it. The general has to shout his commands into a microphone while remaining hidden behind armour. In this situation leadership loses much of its magnetism and control is more and more dependent upon instantaneous communications.

Proofs of the topheaviness of modern military structure are by no means limited, however, to what happened in the desert defensives. On the offensive side, the first burst of power spent itself like a trickle of water on a slanting board. At the rate that mobility was increased by the breakdown of enemy resistance to the armoured forces, hitting power was diminished, or rather was converted into protection for the rear areas. In other words, the rearguard swallowed up the main body. By the time the chase had advanced into the open, the pursuer also had become winded.

This was true even of the 'Dustpan and Broom' operation with which the forces under General Sir Henry Maitland Wilson shattered Marshal Graziani's army during December 1940. Full surprise had perhaps never been achieved in war under more difficult circumstances, and if only for that reason, the campaign will have a lasting place in the book of great martial achievements. The first movement was made at night. During the whole of the following day the British force had to remain camouflaged and inert in the open desert between Matruh and Nibeiwa. In those anxious hours, the glint from a tiny piece of metal might have betrayed the whole position to the Italian air reconnaissance. Such was the chance which had to be taken so that the mechanized 'broom' could push seventy miles in forty-eight hours and move against Sidi Barrani from the west before the Italians had warning of the infantry advance from the east.

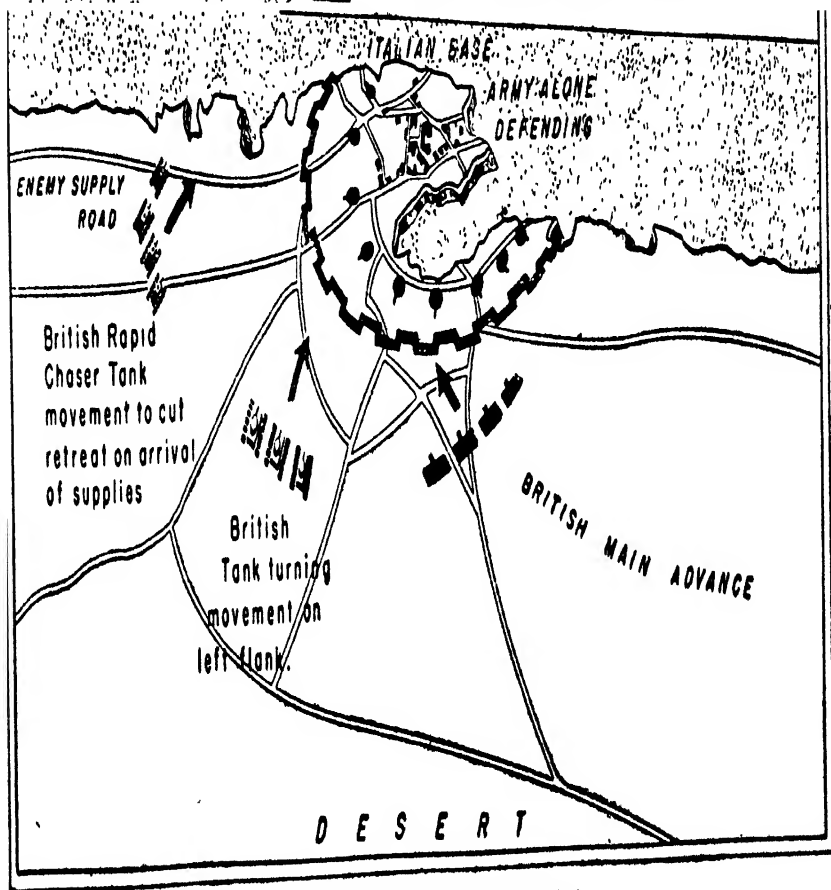
Water for only five days could be made available for the operation. The troops moved out with the knowledge that they would either take their objectives within five days or the campaign would fail. They made it with three days to spare, Sidi Barrani falling to the British on the 11th of December. Surprise had been so complete that when the attacking tanks struck Nibeiwa, the Italian officers were at breakfast and the tanks were idle in their park.

While the British tanks moved out in the wide circle against Nibeiwa and from there to Buq Buq so as to close the Italian line of retreat, the British infantry advanced directly westward from Matruh. The 'dustpan', going only one-fifth the distance

British Air Force

M E D I T E R R A N E A N S E A

British Navy supporting right flank



THE DESERT DUSTPAN AND BROOM

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of the broom, first closed with the enemy in the outpost at Maktila and then pressed on to attack the Italian armed camp south of Sidi Barrani, in which action it was supported by tank elements moving north from Nibeiwa.

During the battle at Sidi Barrani, as in the subsequent fighting westward along the Libyan coast, the advance of the British infantry and of the armoured force was supported by bombardment from the motorized artillery, the Royal Air Force, and ships of the Mediterranean fleet. The naval action completed the circle of offensive power. Swift overwhelming of the Italian outposts, coupled with the defeat of the Italian aviation, left the army without eyes or means of judging the size and direction of the British attack.¹ The British tanks, engineers, and infantry 'dealt directly with the Italian defences of the town'² while the armoured sweep around the Italian rear multiplied the chaos and confusion produced by the circle of bombardment. As protection failed and mobility vanished, all control was lost by the penned forces. They had no choice but to surrender. After the mopping-up operations were completed around Sidi Barrani, Buq Buq, and the Tommar forts, more than 60,000 prisoners were *en route* to the Nile, and most of Graziani's train and cannon had passed into British hands.

The first smashing victory the British won by their own prodigious effort, but for their future successes they owed much of the credit to the unusual accommodation of the enemy. In rapid succession, Wilson's force attacked and destroyed Graziani's subsidiary bases, capturing Solum on the 16th of December, Bardia on the 5th of January, Tobruk on the 21st of January, Derna on the 30th of January, Bengazi on the 6th of February, Agedabia on the 8th of February, and El Agheila on the 9th of February.

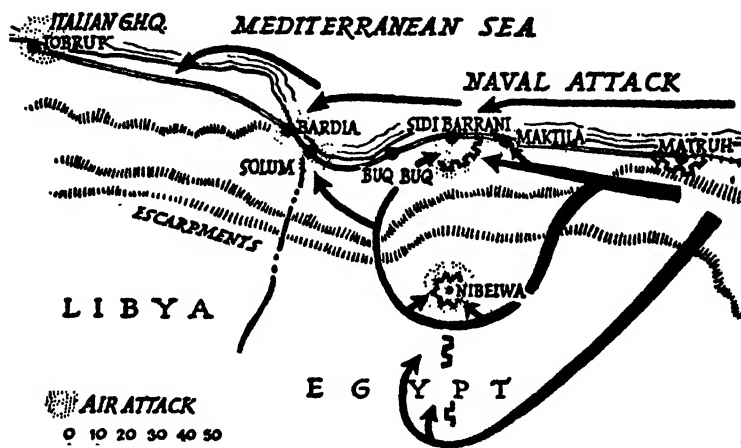
The pattern of the offensive operation had been fairly well established by the Sidi Barrani attack. Because of naval co-operation, which permitted the successive establishment of sea bases with short lines of communication thereto, the British land force was not greatly hampered by its supply problem and its forward movement was regulated almost wholly by the character of the Italian resistance. As the defender could not again be

¹ Graziani's information, if the press reports in Rome are a fair reflection of it, overestimated the British striking strength about 300 per cent.

² Quoted from *The Command and General Staff School Military Review*.

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taken unaware, siege operations were necessary to force the surrender at Bardia. Indeed, the only 'surprise' by which the Army of the Nile profited after the Sidi Barrani battle was the revelation of the incredible stupidity of the Italian commander.



BATTLE OF SIDI BARRANI

Graziani's main chance lay in precipitate flight toward the Cyrenaican plateau with his remaining mechanized elements in the van, and his infantry rearguard serving as best it could to slow pursuit by the British tanks. As the British were operating with extremely light forces, it is conceivable that the 'broom' could not have moved more than one day's sweep beyond the 'dustpan'. With ten days of pitiless marching, and a willing withdrawal from Bardia leaving only the heavy guns to check a British landing, the Marshal might have saved the remaining half of his army and gained some strength as he fell back in successive steps upon the Libyan garrisons.

But there was no good in this general. Pride clouded his reason and kept him from ordering a general retreat. At Bardia and again at Tobruk, he attempted a citadel defence and so his weary forces were staked out on a line of death traps and were sacrificed to his inordinate vanity. The fall of each fortified area weakened

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the stronghold next it. Bardia became easier to crack because Sidi Barrani had gone, and the fall of Bardia weakened Tobruk.

By the time Graziani had withdrawn to a line where he might have stabilized a defence, his troops were gone. They had become corpses in Sahara or prisoners along the Nile. In sixty-two days, during an advance of 400 miles, the British took 133,000 prisoners for a total cost to themselves of 2,966 casualties, of whom only 604 were killed. The Italian dead and wounded numbered about thirty thousand. In this manner ended the first threat to Egypt and the public career of Graziani, whose passing from the scene occasioned only the regret that had he been sustained in his command, he might have continued to do good work for Great Britain and for the cause of democracy.

The victory came when it was most needed. What the Army of the Nile had done had an electric effect upon the morale of Great Britain which was not wholly lost during the subsequent defeat in this same area. For the first time in the war, British land forces had triumphed, and for the first time British soldiers had used tanks as they should be used. Even the tank master, J. F. C. Fuller, would have heartily applauded the plan and its execution, though this stormy genius of mechanized warfare, upon whose principles the battle was founded, was then living in seclusion in Camberley and engaged in writing a paper on Chief Pontiac's attack on Detroit.

The tank 'broom' was a force of exceptionally fast cruiser tanks whose missions were to smash in the outposts, overcome light field forces, and above all, remain in the open and extend the advance to the possible limit. These assignments it covered by grace of the accompanying aviation which got command of the air in the Sidi Barrani battle and retained it thereafter, giving the British tanks the same supreme advantage which the German tanks had enjoyed in the 1940 Flanders battle. Up to the present hour, no tank offensive has succeeded which lacked this sovereign element of air protection, a point to be considered by all who would quarrel about the relative values of the tank and the aeroplane in modern combat.

The tanks in the 'dustpan' force, co-operating with the partially-motorized infantry, were the slower and heavier vehicles of the Army Tank Brigades. They had been especially designed for manœuvre with foot forces and bore such marked features

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as skirts of armour to protect the tracks and an anti-tank two-pounder and a Besa machine-gun as armament. Their task was to batter enemy strong points and protect the British infantry from counter-attack by the Italian tanks by destroying them in detail. The light Italian vehicles proved the easiest of grists for this mill.

Swarms of Bren gun carriers followed the heavy tanks into the battle and poured their fire into the uncovered and already demoralized Italian infantry. The light losses suffered by the Army of the Nile are the most eloquent proof of the skill with which the carriers and tanks covered the advance of their own infantry, though as the mechanized tide rolled on towards Cyrenaica the wheeled forces themselves began to suffer acute embarrassment because of a shortage of spare parts. The problem continued to plague the Army of the Nile and to limit its operation. Britain had ignored Fuller's repeated warnings on this specific point and the shortages could not be immediately supplied either from Alexandria or the factories in England.¹

Had these things not been so and had the Army of the Nile come to Bengazi and El Agheila with its numbers unimpaired by the requirements of rear-area protection, the offensive still would have been without a future. The strategical circumstances had changed as the Army advanced into Cyrenaica. It had been profitable to invade the enemy country so long as there was an immediate opportunity to proceed against his works and shatter his forces. But after the annihilation of Graziani's Army, the Army of the Nile had no foe in its foreground. To advance farther meant spreading itself very thin over a vast enemy countryside and shouldering the task of policing the native population with no prospect of proportionate reward. Too, the Army could not move independently of the Mediterranean fleet, for security's sake if no other, and the fleet's operation was necessarily based on an over-all view of the Mediterranean situation rather than on the local view of the army position in Eastern Libya. British naval action in the narrow seas south of Sicily had been limited to intermittent sweeps and occasional prowls. In such waters the enemy submarine and air power had some tactical advantage. The farther the British fleet extended its supporting action westward, the greater became the hazard of a stroke from Italy's secret weapon—the German air force.

¹ *F. S. R. III.*

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Having perhaps all too briefly considered the limitations of Cyrenaica as a base for the continuation of the offensive, we must perforce ask whether it had any great suitability as a defensive position covering Egypt, for it must be remembered that the protection of Egypt and not the occupation of Libya was the purpose of the offensive. The British hitting forces had at no stage of the advance been more than two divisions, including two tank brigades. The more mobile elements had vigorously and skilfully pursued the Italian remnants across the Jebel el Akhdar Plateau, which mission was fully justified by the further damage done to the fleeing enemy in the course of the pursuit. When the last prisoners had been taken and the offensive came to rest at El Agheila, the Army of the Nile concluded that Cyrenaica was quite 'secure from the chance of enemy counter-attack'—Wavell's own surprising estimate though security is never to be taken for granted in motorized and mechanized war—and proceeded to occupy and to set up its chief defensive position along the high ground of Cyrenaica.

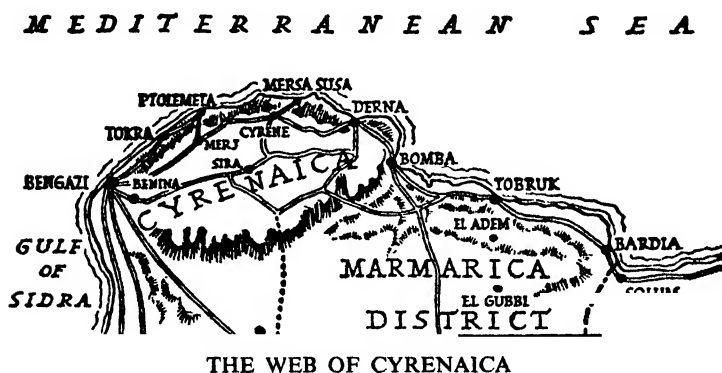
In so doing, it ignored the identical circumstances of ground which it had so expertly used against the Italians. Cyrenaica has a network of roads. The main one describes an arc around the seacoast. A second highway runs inland from the Gulf of Bomba to below Bengazi and is thus a straight line across the base of the arc. By that road forces basing on Derna and Bengazi were made liable to entrapment by an enemy advance against the left flank of the general position. The defensive array had the further fault that the harbour of Bengazi was useless. All supply which came by sea had to be landed at Tobruk and moved an average of 200 miles overland to sustain the advanced British garrisons. There had been no such strain upon British communications in the earlier stages of the operation and to offset it required a further dispersion of British force.

Unfortunately the British command discounted these conditions, partly because of Wavell's mistaken belief that the enemy could not hit back (Mr. Churchill's statement on the 27th of April 1941: 'The Germans advanced sooner and in greater number than we or our generals expected.') and partly because of the natural desire of an army to hold whatever it has conquered. The British defences in Cyrenaica were therefore organized on a total basis to receive and to break down on that ground any new

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Axis attack eastward across Libya. A false concept of position in this case derived from a false estimate of situation, and although the British were inclined to attribute the subsequent defeat to the fact that they had partially stripped the Cyrenaican front to strengthen the expedition to Greece, it is highly conceivable that had these troops remained in Libya, they likewise would have become prisoners in German hands.

To consider what might have been done and with considerably greater advantage, we need to think of the whole British opera-



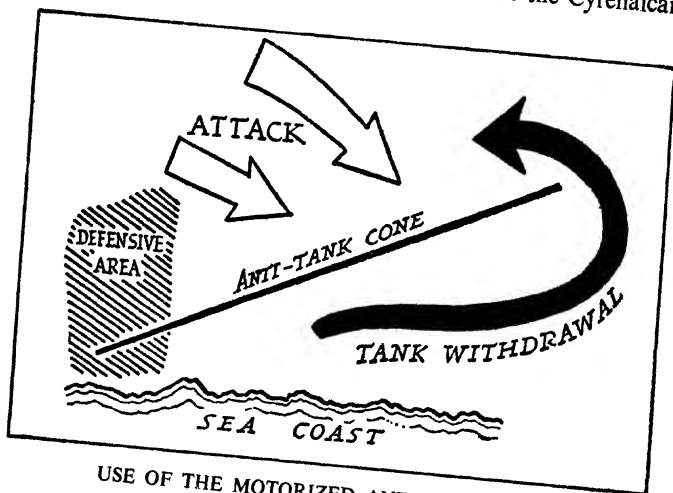
tion in Libya as what General Fuller has termed the offensive-counter-offensive,¹ meaning an advance to engage the enemy, a withdrawal to persuade him to advance against anti-tank defences, and then once more a forward movement to strike him before he can reorganize. Such was William the Conqueror's plan at the Battle of Hastings. When the British in Libya rejected this spider-and-the-fly scheme of drawing the enemy into the web before attempting to dispose of him, they set themselves up to be surprised by the strength of his attack rather than to surprise him with the resiliency of a defensive which was designed to produce over-extension in his own ranks and channel him into areas where he could be successfully counter-attacked by tanks. It is perhaps too obvious for statement that mechanical failures multiply in a tank command in proportion to distance travelled and that offensive collapse from this cause

¹ F. S. R. III.

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becomes so likely that some kind of tank carrier is considered necessary when tanks operate more than a few hundred miles. Such a vehicle is already in use in the German Army, though the development is one which must have the long-range effect of making armoured forces more ponderous rather than more mobile and of increasing the grip of the highway upon mechanized operation.

The perils attending the adoption of an optimistic strategy by the British was apparent for some time before the Cyrenaican



USE OF THE MOTORIZED ANTI-TANK CONE

front collapsed under enemy pressure between the 8th and 15th of April. Two weeks prior to the launching of the Axis counter-thrust by which the British force 'was worsted and its vehicles largely destroyed'¹ this estimate of the general situation was published in *The Detroit News*: 'The position is becoming dangerous and even untenable and the British front may collapse as swiftly as it was organized. An Axis force could strike eastward by manœuvring against the southern bases of the British-held strip in Cyrenaica with an armoured column, avoiding frontal attack along the coastal highway, and doing in reverse what the British accomplished on their drive westward. Even the presence

¹ Winston Churchill's words.

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in Cyrenaica of numerically superior British tank forces would not assure that the ground could be held.'

It seemed then that all of the British-held ground west of Tobruk should have been organized exclusively as an anti-tank zone, and that by basing their tanks in an advanced area from which they could not withdraw at will, the British were taking unnecessary risks with their tank forces as well as assigning them to ground where they would hardly prove useful in the counter-offensive. Mr. Churchill must have had reference to these dispositions when he said later 'serious mistakes have been made'.¹ The great strength of the Tobruk position should have merited the highest regard by the British command. It was the natural pivot for the Nile Army's defensive strategy long before it became the first base around which the retreating British infantry could rally for a defensive stand after being routed from Cyrenaica by forces 'not greatly larger than their own'.²

By that time the British tanks had been thrown into the battle and wasted. Had it not been so, Tobruk might have become the extreme limit of the Axis advance, with the likelihood that the offensive would have passed once again into British hands. The main body of the British defence would have been fresh at this point and the hitting forces of the Axis would have been correspondingly worn by the arduous march across Cyrenaica in which they would not have defeated any large and decisive numbers of their enemy. One can imagine in what perplexity of mind General Rommel and his forces would have approached Tobruk had the extraordinary strength of the defensive base on his left—Tobruk—been complemented by a still-unhurt British mechanization threatening to move against his right flank from the most advantageous ground between Tobruk and El Adem, or even farther eastward. The British tanks would then have been closer to armoured support from the main bases in Egypt by three-quarters of the distance. They might have fared much better and could not conceivably have fared worse.

But such things were not to be. Tobruk was not a victory, though it became the scene of the war's most gallant defence and remained as a bright promise of tactics which may some day enable the British Army to seize and hold defensive bases along

¹ From the speech of the 28th of April 1941.

² Churchill's phrase.

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the rim of the European continent from which the tank offensive will be turned against the military power of Germany.¹

¹ Many authorities have discussed the reasons for the termination of the Axis offensive, and have attributed it to a combination of circumstances—the tenacious British resistance at Tobruk, the arrival of the season of the Khamsin or the return of the British Expeditionary Force from Greece, bringing much-needed reinforcements. Beyond these reasons is the over-all design. Germany's Russian campaign was then in the making and Rommel in Africa was faced with the necessity for seeking a position favourable to the protracted defence. When, in the week of June 16th, the British attacked Fort Capuzzo and Solum, and won a limited success, Rommel counter-attacked in great strength and drove them back in confusion. But he made no attempt to exploit the opening. Here was the first clear signal that the slow-down in Rommel's offensive was consequent to some larger design. The cloak of mystery enveloping Russian-German negotiations was torn asunder, and it was made evident for the first time that Germany intended to attack Russia.

3. *War in the Mountains*

For I assert that the Greek nation itself is friendly and in alliance with itself, though foreign and strange to the barbarian. When, therefore, Greeks fight with barbarians and barbarians with Greeks, we may then say that they are at war and natural enemies; and this hatred we shall call war.

The Republic of Plato

The details of the long-drawn and fluctuating struggle which was concluded with a military conquest of the Balkans by Germany's armed forces, with Italy bringing up the rear, fall neatly into three general groups. There were two sharp and brilliantly-conducted military campaigns and between them the period of German concentration in Bulgaria and diplomatic pressure against Yugoslavia.

With the German concentration we need not concern ourselves except to re-emphasize what was said in Chapter 1, that its effect was decisive. When the German Army massed in the Sofia basin east of the Dragoman Pass, it had for all strategical purposes achieved a concentration against Yugoslavia, and though it continued to brandish its weapons towards Grecian Thrace while the Berlin government sought terms with Belgrade, it was plain that the cutting edge of the sword was held high over the Serbian head. With good reason, the Morava-Vardar river trench has been called the key to Balkan history. The struggle of the Serb race throughout history has been largely a fight for control of this vital communications artery over which conquerors have marched through the centuries.

The Morava River from Nish northward has a broad valley with highways on either side of the stream and a rail line which crosses from side to side to connect with the larger valley towns. The Vardar River from Skoplje southward has a narrow and at times gorge-like channel serving one railway and a highway, which however indifferently constructed provides the one serviceable means for military entry into the delta country around Salonika. The strategic value of the Morava-Vardar trench is that it gives an unbroken channel-way through the mountain

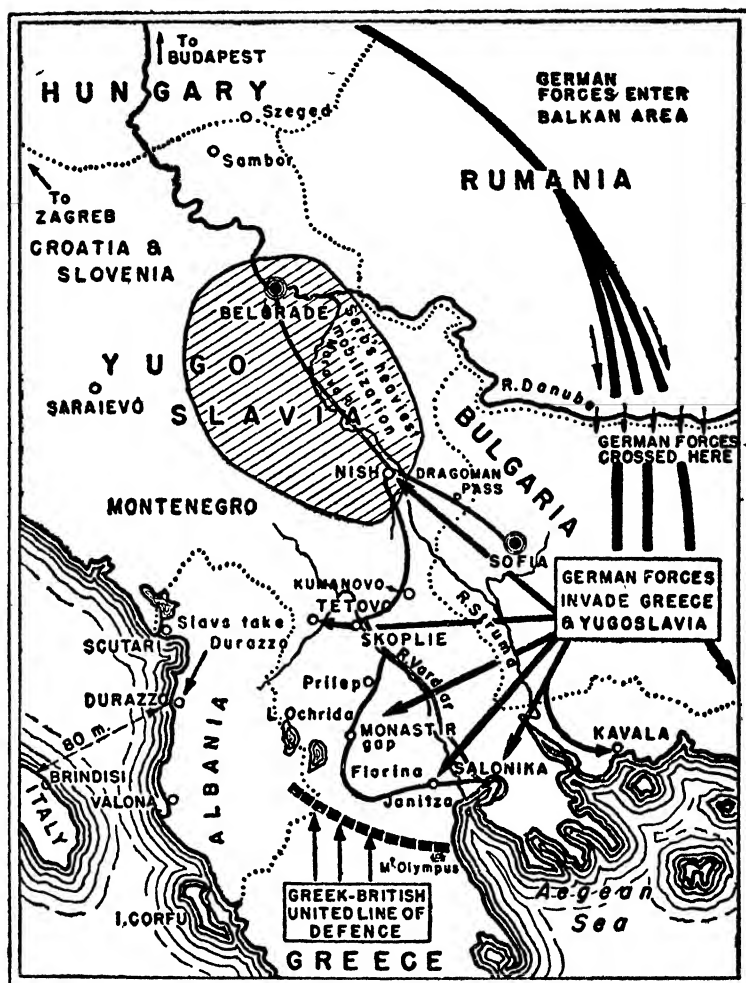
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barrier covering the Balkans. An invading army which has obtained entry into the inter-montane basin between Nish and Kumanovo is on the high road to conquest of all of the Balkan peninsula lying to the west and to the south of Bulgaria. The way is open to Skoplje, which is the nodal point of the communications of Southern Yugoslavia, and beyond Skoplje to Salonika, which bears the same relationship to eastern Greece.

The German plan was based upon these relatively simple geographical facts. When List's army concentrated in the Sofia basin and along the upper Struma River, the supreme task of the Yugoslav Army was to make sure of the defence of the mountain gates along the Bulgarian frontier from the Dragoman Pass southward. The defence failed for two reasons: first, the mobilization plan put into effect by Prince Paul's government was designed to thwart this prime consideration by establishing the gravity centre of the defending army between Nish and Belgrade; second, the British could not base upon Salonika, lacking both the political opportunity and a sufficient quantity of the right kind of military power to warrant an operation from that base.

Once Yugoslavia entered the war, Salonika was the correct strategic site for British operations in defence of the Balkans. From that point forces could have moved up the Vardar to support defence of the passes and covered the southward movement of the Yugoslav Army towards juncture with the Allies. But for that task, Britain would have needed at least 250,000 men fully motorized and with ample anti-tank weapons. A force of such size, established in time, might have repeated Sarraill's unsuccessful manœuvre on behalf of Putnik's army in 1915, and achieved a complete success.

But the means were lacking. The Serb revolution was timed opportunely only for the German enemy, whose army was already set to strike at the vital flank. The best that the British could do as this tormenting situation developed was to hold to their original plan of forming a front with the Greeks in the hope of stabilizing the battle to the north of Mount Olympus and around the Monastir Gap. Some people have called this British effort a strategic blunder. If it was that, it was still the most creditable blunder yet made by an army. It is my own feeling that when the books of this war are finally balanced and those operations are entered on the debit side which hurt more than



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they helped the cause of the democratic armies, the British campaign in Greece will not be found among them.

The story returns now to the beginning of the warfare in the Balkans. In October 1940, the Italians invaded Greece from Albania. Though the Greeks were partly forewarned and had called some reservists to the colours, the army was less than half mobilized. As the invasion began, Greek civilians and a large part of the army were formally celebrating the holiday season known as the 'Little Summer of Saint Demetrius'. The unprepared state of their enemy considered, it was a reasonable expectation that the Italians would launch their offensive with great vigour, and would attempt to strike some kind of paralysing blow from behind a well-prepared protective base, before the Greeks could set themselves. The situation called for a maximum of surprise, shock, and speed

None were forthcoming. There was but one period in the course of this campaign when lightning methods might have succeeded: that was in the first twelve hours. Even then the terrain imposed fearful obstacles, though if the Italians had made proper use of their technical superiority, they would have taken that chance. The weather was favourable, but would not remain so for long, as winter was about to close down over the Pindus range. An immediate advance by the Italian mechanization with strong support by the motorized troops (had these elements been ready) could have cracked the thinly held Greek forward positions, and might have penetrated to the main bases of the Greek Army.

At least that is the conclusion as one approaches the subject in theory. In practice, it does not stand the test of events. Successful audacity is inevitably preceded by painstaking preparation and sound information. As one views this campaign in retrospect, it is to see that the Italians were so wholly lacking in three vital categories of information—knowledge of the characteristics of the enemy, knowledge of the terrain, and knowledge of the tactical limitations of their own weapons—that no 'fast' plan could have succeeded in their hands. In every battle plan weapons must be fitted to the ground as well as distributed according to an idea,¹ because the battle is fought on the ground and not in the imagination. This is what the Greeks remembered and the Italians forgot.

¹ From *F. S. R. III.*

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For one week the war was little more than a series of encounter engagements and outpost skirmishes. In that period the Greeks were able to complete their mobilization and get their artillery forward. From the toe of Albania two Italian divisions moved forward cautiously to the Kalamas River meeting opposition only from minor Greek detachments. In the air the campaign, instead of bearing on the Greek defence lines, mobilization points and roads and bridges behind the Greek lines, took the surprising turn of punitive raids against the cities of Patras, Candia, and Salonika. The bombing killed many Greek civilians but did not in any wise further the advance of Italy's striking force towards Macedonia. The Italian Navy did nothing, though the situation demanded the early capture of Corfu at whatever cost.

The explanation has been offered that Mussolini did not expect sustained opposition from the Greeks and that after a formal resistance by the army the Athens government would yield the strategic points which Rome had demanded of it. Whether this be true or not, the respite saved Greece and ultimately necessitated German intervention on behalf of Italy. The Greek mountain artillery was mainly mule-pack, which compensated for a lack of range in its guns by an extreme mobility in rough country. The role of this force was vital, and its response was immediate. The Greek gunners effected their distributions over the decisive ground during the opening days when it gradually dawned on the Italians that they would have to strike a real blow if they were to have Greece. Italy's opportunity vanished with the arrival of the Greek artillery at the scene of action. The failure of the Italian air power to move against these oncoming forces meant the certain defeat of the Italian armoured force which was then sent into the battle.

The tank stroke was attempted over one of the cruellest mountain countries in all of Europe. The mountains of southern Albania are eroded earth folds of the Appalachian type which rise from four to eight thousand feet in the upper ranges. Between its hard rock ridges the streams have excavated roughly parallel valleys which are of small use to the invader because they lie at approximate right angles to the line in which he wishes to travel. As the advance continues into Greece the ridges are eroded into an even more forbidding pattern. The soluble nature of the

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dominant limestone imposes a peculiarly sinister look upon the country. The mountains are barren and their water-courses run through deep-walled gorges. The 'gaunt, naked rocks of the cruel karst country'¹ make nearly inaccessible the Macedonian hinterland.

Over such a land the manœuvring of air power is made doubly dangerous because of the obstacles offered by the ground itself and the cover which it affords to military bodies enveloped in its midst. The point cannot be over-emphasized in considering the reasons why the Greek defence prevailed without tanks and with little air power. The country in its natural aspect is a formidable problem for any invader and is wholly unsuited to independent tank operation. Tanks might have been successful had they struck swiftly and with surprise along the road from Koritza to Salonika with fullest support from a motorized infantry which covered the rear of the mechanized force and extended the flanks of the general Italian position. When the Italian command failed of such a course and afterwards made hardly a gesture towards reducing the Greek mountain batteries by air bombardment or counter-battery action, the belated effort to succeed with tanks was a gesture either of despair or of madness—it can only be summed up as a military monstrosity.

On the day that the Italians attacked, I made the note: 'Here at last is a new chance for the old tactics and weapons. Lightning operation is still held to account by Nature and the circumstances of geography. Tanks can roll but they cannot fly.'² This view was sustained by the event. The hard fate of the Italian forces which attacked Greece should be remembered by soldiers if only as an object lesson in the limitations of tank power. Thundering herds of tanks cannot dislodge a resolute and vigilant foe positioned on ground of such formidable character that the mobile weapons are unable to concentrate a fire against it. At this point armoured power may become an impediment to the forward movement of armies. It reduces the effectiveness of the total force by making the infantry in effect an escort for heavy weapons which cannot go forward and may find it impossible to retreat.

¹ From Marion I. Newbigin's *Geographical Aspects of the Balkan Problems*. London, 1915.

² *The Detroit News*, the 29th of October 1940.

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So it was with the Italians in Greece. The mechanized hammer which was to have shattered the Greek defences dropped of its own weight. The Greek plan was a model of appropriate action against tanks by an army having none. It would be hard to find a more perfect tactical achievement in the book of war. The de-



GREECE: THE DECISIVE THEATRES

fender sucked the enemy in, beguiled him with an appearance of success and so invited the mechanized operation. As the Italian tanks advanced, they encountered a defensive array almost identical with that which predominated in Greek classical warfare. The Greek flanks were rested on natural and unflankable obstacles while the roaded defiles and gorges were covered with a concentrated frontal fire. Twenty-five miles inside of Greece was the extreme limit of the advance and there the Italian offensive disintegrated from the strain of trying to protect a tank force in a situation from which it could not extricate itself.

Not content with a rout of the enemy on their home ground, the Greeks took the initiative early with a counter-drive against the Italian left wing pointed at Koritza, the main base of supply. On the 22nd of November, just twenty-five days after the Italians began their invasion, that prize fell to the Greek arms and the victorious column pressed northward towards Pogradetz with

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the purpose of later swinging north-westward to reduce the inland bases of Elbasan and Tirana.

The bold advance of the Greek right flank reacted on the general situation. By mid-November sweeping Greek counter-operations became feasible all along the hundred-mile front and the Greeks passed from the defensive to the offensive—always one of the most delicate operations in war—with the same vigour and intelligence with which they had received the enemy. Utilizing the mountain trails and climbing like goats over the rocky slopes along the frontier, they moved swiftly around the invader's flanks, fell upon his lines and rear protection, surrounded his striking forces, destroyed them in detail and then advanced upon his bases.

The offensive developed into a triple-pronged thrust against Porto Edda, Argirocastro, and Tepeleni, and was not checked until it came to the latter town, a fortress position of commanding strength and ruined splendour. Contending against heavy frosts and ever-increasing snowfalls, the R.A.F. attack aviation co-operated with Greek infantry, artillery, and cavalry in developing the pressure while the heavy bombers went far afield to strike at the Italian base ports. By the 1st of December, the Italians were in retreat all along the line.

The counter-attack had two phases. In the beginning it was an envelopment in strength which fell most heavily on the Alpini troops. They were cut off in the gorges and rocky, winding valleys and smitten front and rear. The main body was smashed in the valley of the Sarandaporo. Thereafter the pursuit had the essential characteristics of mountain warfare in the best Napoleonic manner.¹ First, the avoidance of battle where the enemy is strongly positioned or in possession of a town. Second, the encirclement of his position followed by the picketing of his rear and harassment of his communications. Third, development of this pressure and of attack from the flanks until he is compelled to withdraw.

In this manner the Greeks pressed on towards their great objectives in an advance that shall always remain notable for its lack of deviation from sound tactical principles. They asked no rest from the enemy. They gave none. By the 10th of December, one-fifth of Albania was in their hands. Tepeleni had been brought

¹ See the *Maxims*.

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under the fire of the Greek artillery. R.A.F. bombers had battered Valona so consistently that the Italians evacuated it and entrenched in the hills. Along the shores of Lake Ochrida a slender Greek column fought snowdrifts on the way to Elbasan.

But just as it seemed that their skilful and determined efforts might achieve a victorious fulfilment in the total destruction of Italian forces in Albania, there came weather more terrible than any battle. Troops which had rallied and rushed to the fighting front in October in too great haste to prepare against the rigours of a winter campaign huddled together in the rocky defiles bound to their own camp fires. The arduous and patient flank manœuvring via the mountain trails became impossible as the hillsides turned to glaciers. Other problems which were quite beyond the control of its generals arose to plague the Greek Army—increased difficulty in bringing supply forward because of the snow-blocked trails, the exhaustion of munition reserves, and the diversion of British air support to the newly active theatre in Libya. The Italians, almost by standing still, and aided by the elements which always equalize the battle by favouring an unwilling soldiery, were able to keep from them the final rewards of their audacious manœuvre and gallant effort. By mid-January the front was frozen solid along a line running north-eastward from Valona, then turning south-eastward to form a salient at Tepeleni and running due north again to a position near Elbasan.

On that line the campaign ended. The initiative passed to the winter weather. The Italians made one more attempt to retrieve it before the snows had thawed. The result was unrelieved disaster. In mid-March they attacked in force between Trepeli and Bubesi along the Trebesina Range with the object of opening the road to Klisura, relieving the pressure on their own centre, and imperilling the Greek right. To witness the victorious advance of his own legions, Mussolini went to Tepeleni, which had not been thus honoured since the middle of the eighteenth century, when the remarkable Albanian brigand and despot, Ali Pasha, used it for his headquarters. There followed the bloodiest repulse in the four months of war. All along the twenty-mile front from Tepeleni to the southern flank of the Tomor range, the Greeks stood their ground and broke the onslaught with a merciless fire. The battle lasted six days and cost the Italians 40,000 men. It ended

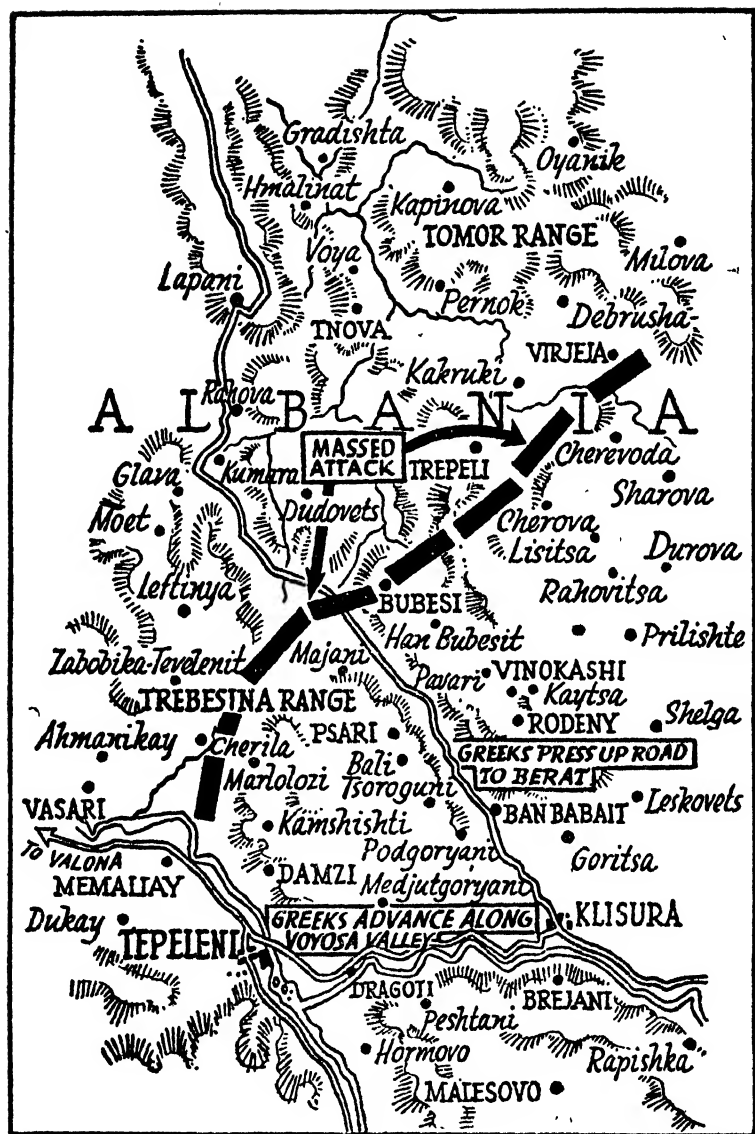
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with the general Greek position unimpaired and the Italians forfeiting their last chance to force a passage along the Voyosa River and resume the offensive into Greece. They knew then that what they had undertaken in such reckless and cavalier fashion they could not finish, and though Tepeleni did not end the war, or lessen the terrible peril of the Greeks, it denied the Italian Army a last shred of honour.

For that it needs to be remembered. The battle is set apart as an inspirational achievement climaxing four and a-half months of brilliant operation, and it marks a turning-point in the war. The shadow of the German Army already lay athwart the Lower Balkans. The German concentration in Bulgaria was almost complete. But had the Greek Army been broken at Tepeleni and compelled to withdraw eastward, it seems probable that the dissolution of the Greek defensive would have forestalled the German operation by weakening Yugoslavia's position and withdrawing from the Serbian revolutionists even the illusion of a military position around which it was possible to rally a fleeting resistance. One cannot resist the temptation to examine the infinite possibilities of this one field. Had the Italians advanced again into Macedonia, the Bulgars might have snatched at Thrace, the Belgrade government might have seized the opportune moment to deal for Salonika, and the whole Balkan situation might have been finally liquidated before the forming British Expeditionary Force was given a chance to strike one blow at the enemy.

Such was the significance of Tepeleni. But for the defender it had its terrible price, also. The ground which had been so dearly won was held at even greater cost. The preponderant strength of the Greek Army—the best troops and weapons—were of necessity concentrated in that wing. When the German lightning fell on Yugoslavia there were no longer any battles to be won in Albania and the hour had struck for the Greek Left to yield that ground to its faltering adversary. But this, for reasons concerning which one must suspend judgement, it did not do. Tarrying until the line of retreat was no longer open, surrounded at last on all sides by the enemy, it was surrendered in a body and became the greatest sacrifice to its own glory.

The German plan for attack on Yugoslavia which had foredoomed this Greek Army in Albania was simple in outline though complex in execution. It consisted of a holding attack all



BATTLE OF TEPELENI

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along the upper Yugoslavian border with two main thrusts west through the mountains of south-west Bulgaria into the Vardar Valley. The first was the drive along the Strumitza Valley and the second was the advance from Kyustendil on the Bulgarian frontier to Skoplje.

Both of these drives had a double strategic purpose. North of Salonika along the line of the Struma River the Greeks held gallantly at the Rupel Pass until they found their left flank dangling in air as the light Yugoslav forces covering the Strumitza fled from the German onslaught. It was not remarkable that an anguished cry went up from the Greeks at that point. The one vulnerable segment in the natural defences of Salonika is along the Vardar River between its flood plain and the Amatovo Lake. When the Yugoslavs quit the field, this gate was opened wide. The capture of the port and the isolation and defeat of the Greek force in Eastern Macedonia and Thrace followed in due consequence. In coming into the Vardar Valley the German column which had forced the passage of the Strumitza divided, the one half moving south upon Salonika and the other half advancing west to Veles and thence to Bitolj and the Monastir Gap. Here again they profited by the unreadiness of the defender. The actual invasion began on the 6th of April. Two days later the Germans were at Veles. On that same day Monastir was evacuated by its force of Serb military police under instructions to surrender it to the Germans. There and at all points along his frontier the defender was lacking in both anti-aircraft and anti-tank guns. His collapse was therefore certain. In the state of the weaponing of the Yugoslav Army is the answer to the riddle of how the Stuka-supported panzer attack was able to penetrate the mountain defences. Cecil B. Brown, an eye-witness, stated the terms of this campaign very clearly when he wrote in *The Saturday Evening Post* on the 23rd of August 1941: 'They [the German tanks] rushed down the road in a single roaring file. These steel monsters recalled an ironic picture of the Yugoslav Army. Just a week before, driving in a pelting rainstorm at three in the morning from Vrnjacka Banja to Uzice, we'd passed 1,500 ox carts hauling supplies and ammunition to the front. Yugoslav ox teams moved at about three miles an hour.' Tanks against ox carts! When the odds are stated so clearly, it is taking false judgement on the battle to regard the German

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break-through at the eastern passes as a phenomenal feat of arms.

The advance upon Skoplje—which was the shortest path by which the Germans could send aid to the shaky Italians in Albania—was almost immediately successful. A German detachment—undoubtedly a motor-cycle force—reached it on the 8th of April, and it was recaptured and lost again by a Yugoslav force on the following day. So the heart of Yugoslavia's defensive communications passed into German hands, and with it went decision in the Balkan campaign. The Serbian troops in Macedonia were cut off from those in the north. The wedge had been driven between the British-Greek forces and the main manœuvre army of their ally.

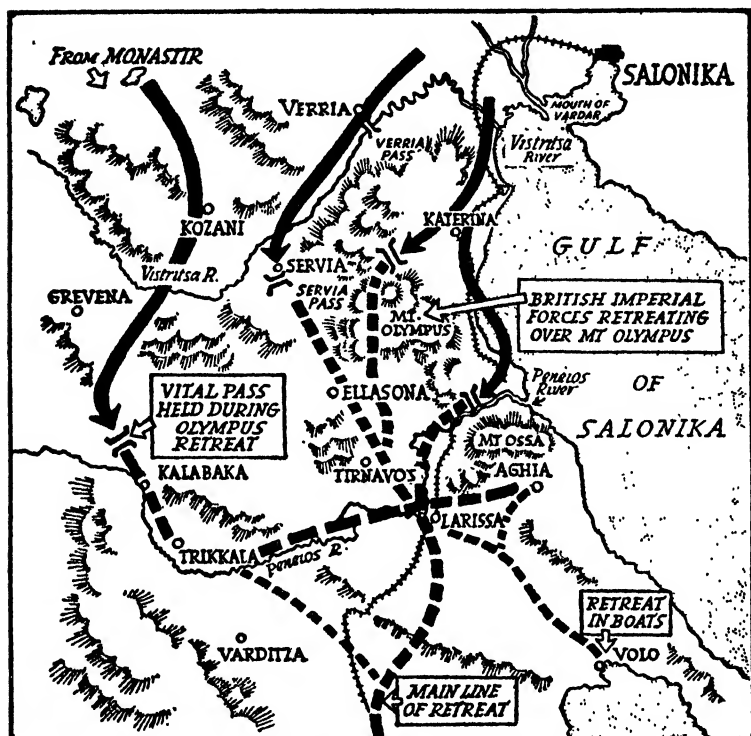
Although the blitzkrieg column striking southward to the Monastir Gap had not then made contact with the Greek-British Army of the centre, the battle had been won, the tide had become irresistible, and nothing remained for the force defending northern Greece except to play out the string and save honour when all else was lost. The Imperial forces made one forward movement—an advance to the Monastir Gap by a reinforced brigade with artillery and anti-tank weapons. These elements came under enemy pressure north of Florina with consequences so alarming that a general retirement was ordered forthwith from the planned Greek-British line which stretched 150 miles from Monastir to Mount Olympus. On the 14th of April, after a long fighting march, the army formed on a new line south of the Vistritsa (Aliakmon) River but hardly had time to settle there or to unlimber. The Vistritsa describes a right-angular course across northern Greece flowing south-eastward from its source then bending north-eastward to empty into the Gulf of Salonika.

Into this mountainous wedge the German striking forces now converged. One column from Salonika advanced against the British flank on Mount Olympus. The force from Monastir moved straight southward towards Kalabaka. By this operation the Greek Army in Albania was finally isolated. At Kalabaka and Tirnavos the British took up covering positions to permit the withdrawal to Thermopylae on a line south of Lamia. The new position was occupied on the 20th of April.

With the round-up and annihilation of the Yugoslav forces,

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riddled by defection and rent by panzer columns which swept in from the north after the south-eastern defences had fallen, this narrative is not concerned. Nor is it desirable here to follow in



DETAIL OF THE BRITISH RETREAT

detail the running fight of the British-Greek Army as it fell back towards Athens. The tactics were those of calm desperation. It would be slighting the leadership of General Sir Henry Maitland Wilson not to recognize, however, that his forces carried no such power into Greece as to warrant the view that it could make a stand-up fight against the invader. The tank brigade was uselessly wasted. Of the British anti-tank strength, it has been written by some observers that the expedition carried fewer A.T. guns into Greece than there were tanks sent against it.

There is a great human story to be written some day of the

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fidelity of the allied forces who fought shoulder to shoulder during the retreat. Certainly it is a task for the eye-witness. None other could picture the brief triumphs and enduring travail of this pitifully under-armed band of men who fought without reserves and without such weapons as would have sustained them in the kind of war to which they had been committed.

They had failed on Mount Olympus and when they came to Thermopylae they could not hold the pass. But 'if the gods whose seeing mind is not as ours' looked down they must have marvelled at the new glory which these foreign arms bestowed upon a hallowed soil.

4. *War Across the Steppes*

It is not sufficient to kill the Russians. One has to knock them over. /

FREDERICK THE GREAT

Of the late Field-Marshal Sir Henry Wilson it was remarked by a distinguished contemporary that 'he had a gift for making every situation clearer than God ever intended that it should be'.¹ There is always this temptation when one treats of a military problem. Vast simplifications seem to be regarded as necessary. Unequivocal answers are mistaken for essential truth. The eternal quest is for some monosyllabic explanation of the most complex of mysteries and a reduction to the lowest common denominator of all the formulae comprising the whole elaborate design.

Thus the World War was won by 'blockade' and lost by 'collapse of the civil will'. In the present war France fell because of 'treachery' and of misconceptions based upon a 'linear strategy'. The most recent addition to this gallery of snapshot analyses is that the German campaign in the U.S.S.R. marks the 'failure of the mechanism of blitzkrieg'.²

Now here is an analysis that provides an interesting approach to the study of the Russian campaign, for it involves the most profound questions of tactics, strategy, and policy. What is blitzkrieg? If its essential is armoured force operation, then it is an unusual thing that the effect of the 'failure' in Russia has been to force tank production higher on the priorities list in every country. But if it signifies unannounced total attack upon an unready opponent, then blitzkrieg was not attempted against Russia for Germany declared war and the Red Army was prepared.

Let us therefore reject both of these ideas. To see the Russian problem clearly, it becomes necessary to think of blitzkrieg not as a 'mechanism' or plan of operation at all, but as a doctrine of

¹ John Buchan in *Pilgrim's Way*.

² Max Werner, in *The New Republic*, on the 18th of August 1941.

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war on which the modern German Army and Hitlerism have rested their fate.

It has been so regarded in the past, but always with the limiting concept that the bid for victory should be made with one paralyzing blow by the mobile striking forces of the ground and of aviation, based upon the slower foot masses. As I noted in my first chapter, the great distances from the frontiers to the decisive points of attack forbade any such dream by the Grosse Hauptquartier when the assault began on the Soviets. Either that is so, or its staff were madmen who had become drugged with the over-confidence which comes of easy victories and deluded by their own propaganda into a belief that the hosts of Communism could not or would not fight for their society.

The first attack was made. Its results must have been quite gratifying to the German Army largely because their enemy made the opening mistake of concentrating excessive manoeuvre forces adjacent to the frontiers. The results, however, were not decisive. Nor could they have been so. The German mobile forces had no such striking radius as would have enabled them to pierce mortally the main body of the Red Army and penetrate the defences of White Russia. They could not make another breach like that of Sedan¹ to insure the defeat of an interior position such as the Weygand Line.

So if blitzkrieg demands the paralyzing blow, its failure was implicit in the situation. But it is not that. Specifically, it is a doctrine of war having this fundamental, that the mobile, motorized hitting weapons of to-day make possible the continuing and unlimited offensive. It does not consider that if the armoured forces fail, then the general battle can be delivered into the hands of the slow foot masses and the offensive force will accept reluctantly the accompanying conditions of stalemate, attrition, and trench warfare. The tanks must not fail! If they are checked on one front, they seek and strive against more vulnerable ground. When the total panzer strength in action proves unequal to its mission—as has been the case in Russia—then generalship is at fault or production is too slow and the thing to be done at all costs is to get forward enough tanks to restore motion to the battle.

This is blitzkrieg in its last essential. When it fails Germany

¹ *Blitzkrieg*, by S. L. A. Marshall, New York, 1940, p. 120.

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will be a beaten nation. That which has proved its chief source of power in the past is in the end its greatest weakness. In the history of war we are told that the passive defence inevitably leads to ruin. Yet J. F. C. Fuller is the only writer to lay it down that the unlimited offensive can be bracketed with it, and when he wrote those words he was speaking specifically of the offensive with armoured and motorized power.¹ The old German Army had its breaking-point. That of the new German Army may be reached much sooner because of the fatal flaw in its doctrine—but only if the enemies of Germany can out-match it in armoured power and support it with a doctrine which is based upon the closest combination of offensive and defensive fighting.²

Now is the time, therefore, to pronounce the failure of blitzkrieg. It received not more than a body check during the July–August campaign in White Russia. Its mechanism moved great distances following that battle. The Western Ukraine was swept clear of Russian forces. Tallinn was taken and the German forces moved up to the gates of Leningrad. In these operations armoured and motorized power heavily supported by the striking weapons of the air broke ground for the advance. That the same kind of attack had failed at Smolensk and the action came to a standstill which was dissolved by Marshal Timoshenko's September offensive around Gomel did not wholly offset this showing. In war between partially mechanized armies, the armoured attack must fail many times. Its supreme value is the mobility which enables it to withdraw from a bad situation and retrieve it by striking successfully in a more favourable quarter. A governing principle, therefore, is the avoidance of a situation which commits tanks to attack along one line until they prevail or are defeated. This the Germans forgot in their frenzied effort to clear the road to Moscow. A corresponding principle in the

¹ F. S. R. III.

² The reader is referred to the German official manual, *Truppenführung*. Its pages bristle with the spirit of offensive war and minimize defensive principles. Wherever protection is mentioned, the text appears to have been written in fear that the wrong word might encourage a defensive attitude. A minimum of troops should be assigned to protection, says the book, and its needs should be considered secondary to a bold and active reconnaissance. In an encounter battle, where both sides advance simultaneously, *Truppenführung* says that boldness on one side will always make the opponent halt to receive shock. 'Better rashness than inertia, better a mistake than hesitation.' Such is the essence of the doctrine in which the German military mentality is steeped.

WAR ACROSS THE STEPPES

defence is to produce such over-extension in the armoured advance as will encompass its ruin. This the Russians remembered.

It is not my purpose, however, to go into any general description of the campaign in Russia—the most significant details being unavailable—but simply to point out why we should consider that mechanized and motorized attack will continue and tank forces will dominate the offensive action on both sides so long as the U.S.S.R. remains an active war theatre. Though this view runs counter to the popular belief that stagnation will increase at rapid rate as the battle draws out and the weakening of armoured power will be in ratio to the protraction of the struggle, the conclusion seems almost inescapable that the campaign will fluctuate with alternate surges of lightning operation and siege warfare until one side is defeated. The nature of the fighting will be determined by general conditions as well as by the circumstances of the immediate foreground—not by the failures of tank power.

One such governing condition is the weather. Here again a word of warning is necessary, as there is a tendency to regard the onfall of the Russian winter so hopefully as to spread the impression that the armies will have no choice but to put on their ear-muffs and fur-lined bootees and retire to an igloo until the spring thaw arrives. The general effect of winter weather is immobilization. The general effect of immobilization is to give advantage to the defender, since whatever limits movement is an aid to static power.

Even so, I venture the opinion, which must remain in solution until proved right or wrong by the passage of events, that Russia's hard winter will not change things very much. The fighting will continue with scarcely any slackening of pace.

In the immediate foreground of German operation during September there lay two siege operations, or three, counting Odessa. The two principal sieges, at Kiev and Leningrad, had to be successfully concluded before the German Army could regain liberty of manœuvre. Until these cities fell into German hands there could be no fresh advance to Moscow. Over-extension of the German centre had already strained German communications to a point which was embarrassing the two major operations on the wings. German strength was being sapped by a non-productive field warfare at a time when the utmost effort should have been concentrated in siege operation.

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For it needs to be remembered that though siege is the antithesis of mobile warfare, in the end the one always begets the other. Siege is all slow-motion and painstaking method. Circumvallation necessitates the bringing up of siege trains, the organization of siege lines and the arming of these lines with static forces. Air striking power is helpful to it but is not essential to its progress so that the grounding of air power by bad weather need not break off the action.

Armoured power—the tank—is out of its element when the battle settles down around a city. Its supporting action then is properly directed against the rear lines of communication and in counter offensive action against enemy forces which are moving up to the relief of the besieged position.

We are considering, therefore, a war wherein decisive action may occur in winter as readily as in summer. The tanks even may be helped in their general mission by the arrival of harshly cold weather. The ground freezes solid. Swamps, lakes, and rivers which had been impassable obstacles are no longer a protection to the defender, but allow crossing surfaces to the heavy vehicles of the attacker. A snowstorm may serve the purpose of screening an armoured force advance or of obliterating its tracks. Snow itself becomes the best of camouflage materials in a whitened landscape.

The record of this war's winter campaigns is clearly to the same point. The Red Army mechanization did not fail during the 1939–40 attack on Finland because of the winter weather; it failed because the Russians did not know how to operate with tanks and scorned the most ordinary principles of security. The battle of Soummosalmi was the horrible example of the Red Army's tactical weakness.¹ On the other hand, in the operation through the ice-bound valleys of Norway in the spring of 1940, the advance of the German panzer columns upon Andalsnes and Trondhjem was the decisive movement.

So it is far from certain that operations in this Russian campaign will be stalled by natural conditions. In the end, Russia will be lost or saved according as the Red Army fares with aggressive offensive action from a defensive base. Only fighting will do it. That means tank fighting and motorized infantry supporting tanks. As any mobile war depending upon field opera-

¹ *Blitzkrieg*, by S. L. A. Marshall, New York, 1940, p. 47.

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tions is far less costly and destructive than a defensive campaign, and is also apt to be of shorter duration, it is to the advantage of both armies to restore movement to the battle. If I am correct in this, then there is no long-range advantage for the Red Army in a retreating defensive. The notion that the Russians might somehow withdraw to behind the Urals and so thwart the German offensive is false strategy because it disregards the fundamental nature of the war.

The main chance lies in the attack where the situation is favourable for the attack, and in defence where the object is protection of vital industrial centres and main bases or the approaches to them. As the immediate protection of these nuclei of defence is provided by static forces, it follows that the principal problem of the Red Army's mobile anti-tank forces as well as of its mechanization is to restore movement to the battle by offensive operation. To maintain offensive mobility from a protected base is the ultimate problem in mechanized war. Economy of force depends upon it. The surest protection for one's own mobile weapons is movement forward; two hundred miles of retreat will wear a tank down as quickly as an advance of the same length into enemy country, and nothing is accomplished by it. Continuous offensive action by the mobile land forces, or the threat of it, likewise provides a certain immunity from air attack. Aircraft cannot develop its full offensive power when its bases are insecure or are kept well to the rear because of the danger from envelopment. Russian counter-attack on the ground was one factor in the decline of German striking power in the air during the 1941 autumn.

The dual nature of the new warfare—siege and mechanized movement—creates a complex problem for the defending air force. As ground forces lose their mobility through siege operation, so will the air power of the defender lose mobility, while the effect upon the attacking air force is exactly the opposite. The confinement of ground forces within a fixed position of defence does not occur until the mechanized elements on their frontal area have lost their potential for effective counter-attack. When that happens, the main threat to the air bases of the attacking force ceases, and they can with impunity move much closer to the advanced battle zone and their offensive value is increased by reason of this new proximity. When they are able

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to strike from any part of the perimeter of operations, they have a decisive advantage in manoeuvre over a defending air force whose position has become cramped and extremely vulnerable to attack by the besieging artillery. The gradual deterioration of the defending air position until the attacking forces at last attain undisputed command of the air is therefore apt to mark the decisive stage of the battle. There could be no more forceful illustration of how mechanized power, even when its influence is wholly negative, reacts upon the character of all operation. As in field warfare, the interdependence of the two arms, aviation and the mobile ground force, in the organization of a successful siege is so complete that it is impossible to estimate the value of the one without considering its relationship to the other.

The lessons to the air defences of modern cities are clearly marked. The inevitability of siege makes the construction of underground hangars, the camouflaging of aerodromes, and all such protective techniques utterly necessary. The air power of every defensive base must be given as many safeguards as a munitions reserve.

It has been noted already that field warfare invariably begets siege warfare. We have seen in the campaigns of the first two years of this war that the primary effect of mechanization and motorization is mobility of operation. The secondary effect is to superinduce the construction of fortified zones of resistance. What does this mean from the standpoint of protective principles? Primarily this, that linear defence has been succeeded by area defence, and the latter will remain the natural order throughout the era of mechanized war. Liddell Hart among others liked to speak of the Three-to-One superiority of the defensive in the linear battle array of comparatively recent times. Without attempting any nice mathematical calculations about it, we might say that in the period of warfare now opening, area defence will be to mechanized offence as one Siamese Twin to another. Where the one appears the other will be also.

The campaign in Russia marks the first clear development of this pattern during the Second World War. The British defence of Tobruk was the first isolated but successful action in a battle zone. Keeping the general principles clearly in mind, one grasps for the first time the significance of the defensive plan followed by the Red Army. Marshal Timoshenko's fluid defence of the



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ground covering the distant approaches to Moscow, marked by the 'sly tactics' of his troops, the use of concealed fortress positions and the appearance of resistance centres which had been camouflaged as peaceful villages, becomes concentric with the holding effort at Odessa after the collapse of the general front in the Western Ukraine. The stand at Leningrad and the defence of Kiev are consistent to the same end. Each of these operations was an area defence. Having the same strategical purpose, they varied in tactical form as the conditions permitted field warfare and consequent flexibility in operation or fixed the defender in fairly rigid lines around populated areas which are generally unfavourable to mechanized attack.¹

To speak of area defence as a 'lesson' from the Russian campaign, however, would be to infer that thinking soldiers had rejected what was already obvious. From the day when tanks began to destroy armies by penetrating a defensive belt and then manœuvring against the exposed flanks of the forces which operated therein, it was a matter of plane geometry that the defence against the mechanized attack lay in the organization of the flankless position. One might think of the change roughly as a substitution of concentric circles for parallel lines.

With the abandonment of the frontal battle array and the development of area defence, it is apparent that there has occurred a revolutionary change in the relationship of defensive strategy to the protection of communications. On the one hand, it is observed that the modern army, with its great numbers of men and vehicles and consequent need of unlimited supply, has forced the axial lines of advance to make utmost use of highways and railroads. On the other hand, it is seen that the nature of area defence will permit no such spread in the fighting front as would provide absolute coverage of the defender's rear areas.

If it is correct that the flankless army operating in an organized zone cannot at all times make the security of the rails and

¹ The importance of cities as centres of resistance to the advance of armoured forces has been much overlooked, largely because of the easy surrender of Paris and the swift collapse of resistance in the northern French cities. But it is primarily because the tank may not advance frontally against a city or large town in any safety that the populated areas become resistance centres tending to stabilize the battle. Low visibility and poor audibility both handicap the tank in street fighting. They are in constant danger of heavy fire from the upper floors of buildings, and can be stopped by heavy barricades or deep craters in the street, and so destroyed by burning fluids or grenades.

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roads leading from its rear to its main bases the controlling object of its defensive manœuvre, then it must follow that security is obtained primarily by the retention of offensive mobility.

The defensive area may be encircled many times by enemy infiltrations—as happened in the Smolensk fighting—and its lines to the main bases may be temporarily relinquished to the enemy for the sake of preserving an essential unity in the combat zone and of conserving the forces of the counter-offensive. An army so placed then becomes in effect a hostile force camped on the rear of the invader and capable of reversing the whole situation by striking against the enemy bases.

It is a strange convulsion. At first glance it may seem wholly opposed to the eternal principles of war, the objection being that armies do not risk their communications because separation from supply is the next thing to defeat. Then it is realized that in this day of motorization and mechanization, communications are not only rail and road lines but any stretch of open countryside across which the tracked vehicles of the modern army can travel. The army which retains the power to strike offensively with the mobile weapons can never be wholly separated from its bases. A decisive portion of its communications are self-contained. To make again a comparison with defence in the realm of sport, there is no danger whence No. 4 at polo tends to ride through with the ball provided he has as his counterfoil a No. 3 who is ever ready to gallop in the opposite direction.

What other lessons? As the defence of Russia tightened down around the cities of Leningrad, Kiev, and Odessa in September, Major-General Stephen O. Fuqua made the penetrating observation that 'a study of the offensive and defensive tactics of this war definitely reveals that fortifications have not out-lived their usefulness'.¹ He might have gone even further than that. Mobility has increased the value of field-works. As mobility expands bases grow in importance. For mechanized armies are like the fighting forces of the sea; the more bases they have at their service, the greater is their capacity for manœuvre. The defensive power of these bases will reside in their fortifications though such works will not be continuous but will consist of a zone of redoubts and strong points disposed in such manner as to place the communications of any enemy entering the area in danger.

¹ *Newsweek*, 15 September 1941.

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When armies move on wheels, their bases must be prepared to stand full siege—it is inevitable in the nature of the new warfare. To accept this premise and yet argue that fortifications have had their day is more than an anomaly—it is absurd.

As long as the bases remain, the field army is provided with a future, and the greater the number of its bases, the greater becomes its mobility. The base which is put under siege is therefore defended primarily by its field army, and the two kinds of warfare react mutually upon each other. Where the field army already has been permanently separated from its base through the superior manœuvre of the enemy, a siege defence has hardly more than a nuisance value, and may be purposeless. Either the siege points are pivots for ultimate counter-attack or they have very little strategic significance. A national defence cannot break down into fragments of armies fighting from behind walls and in bunkers around vital bases, and unable to leave their protecting cover. Not in this age of warfare. When that stage is reached, it is already defeated and is gasping in its last ditch. Nor is there any greater hope in a field army which has such inferior mobility that it cannot undertake counter-offensive measures on behalf of its bases. If it cannot move it cannot survive. That was why the defence of Kiev collapsed so quickly after the Germans had crossed the Dnieper at Kremenchug and moved another force down the Desna into the area west of Kharkov. Their air observation failing them because of Germany's superior concentrations, the Russians could not anticipate the direction of the German blow. Their mobile power failing them because of the heavy wastage during the first three months of the war, they could not get over the ground fast enough after they once knew the point of danger. Surprise was the essence of the German plan against Kiev. It was at the heart of the German Army manœuvre into the Eastern Ukraine which preceded the defeat of the city. The operations comprised the perfect example of the strategic objective in mechanized war—to separate a field army from its base and destroy them both independently.

Of linear defence there remain only such portions as are a gift to man from nature—a mountain position with flanks resting on unflankable obstacles, a line of seacoast or a broad river barrier such as the Dnieper. Considering these collectively, one may take as the basic principle that security and protection will

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not be obtained primarily from defensive works but from the mobility, fire power, and depth of organization in the manœuvrable forces disposed along the defensive line. In the maintenance of such a defence, the desirability of great speed, quick-laying features and cross-country ability in the artillery cannot be over-emphasized.

In the motion picture of yesterday the patron was sometimes provided with a viewing mask having one green and one red lens through which to view the added attraction. Viewed with the naked eye the picture was a jumble of colour, a flicker and a flash which hurt the vision and meant nothing. Viewed through the mask, it leaped right out at one in clearly defined triple dimension.

If, through some such device, it were possible for us to look at the Russian campaign, its diffusing colourations of propaganda and conflicting battle reports could reassemble into a clear picture. Perhaps it would not be a detailed portrayal of the battle as it is being fought to-day, but we would have a new perception of its depth and of its movement. And as it is movement alone which provides the link between the present and the future, we would at least know more about the kind of war that will be fought to-morrow.

We would see in its outline the unmistakable resemblance to warfare in the Middle Ages. Only instead of the medieval castles of the feudal barons, the great industrial cities of to-day are the pivots of defence. They have been made strong in armour and within them powerful static forces move and prepare to resist the enemy as he advances towards the moats. All strategical centres will be integrated in this network of defence. Cities which are built around defence industries, the vital railway junctions, the national capital, sources of power, aerodromes, seaports—all will be organized for war. In between these pivots of a national resistance, the armoured knights of to-morrow—the fully mechanized and motorized field armies—will manœuvre and give battle to the mobile forces of the enemy. The strategic objects of campaign will be to isolate the defending field armies from these bases of support and refuge, destroy them in detail and then lay siege to the cities.

Nor is this all. The threat to coastlines from tank attack will grow with the war. All of the signs are present. In the Mediter-

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anean the British are using special tank boats, carriers with light draft and an open side which can move in towards a shallow beach and discharge their cargo in shallow water. In the fighting along the Dnieper, Dniester, and Berezina, the Russians surprised the Germans with heavy attacks by masses of true amphibian tanks which move through water like a submarine running on the surface and then crawl ashore to advance against the enemy. From such developments even the most unimaginative layman should be able to visualize a future in which shoals of sea-going tanks will leave their mother ships well off-shore on a calm night and strike at a seaport which would serve as a suitable base of operations for the general invasion.

If it is a terrible picture, it is nevertheless an extremely logical one, and as undeniable as a mathematical law. For this is war carried forward a step and perfected. Mechanical movement of military force by sea, on land, and in the air totals up to no other score. The only reason that any of the details are lacking to-day is that modern defence has lagged, and the armies still do not see the full implications of armoured offensive power.

In its terror lies its hope. For if the civilizing forces of earth can once understand how terrible modern military power can become unless it is brought under some form of control, a clear trumpet call will be sounded and they will unite boldly for its defeat. That will be Armageddon and afterwards may come the longed-for peace.

PART TWO

THE NATURE OF MECHANIZED POWER



5. *Return of the Infantry*

An army so built that it serves military men, not war, is militaristic; so is everything in an army which is not preparation for fighting, but merely exists for diversion or for peace-time whims.

ALFRED VAGTS

It must already be obvious, but in order to avoid any possible misunderstanding let it be clearly stated that this book is not a plea for mechanization and motorization to the exclusion of all else and that its author is not of the company of those critics who continue to insist that we should reconsider our plan for a national army and substitute for it a 'small but highly trained and exceptionally mobile professional force'.

Such objectives are very easily stated and they sound most impressive, but they are as unrealistic as the talk of balancing the national budget in our present circumstances. To put it bluntly, there is no way to form such an army, and if there were it still would not suit the purpose. Those who have consistently maintained otherwise have just as consistently failed to support their case with substantial evidence based upon the campaigns of the present war, or by any rational view of the relationship of our military position to the world power problem.

In the early nineteen-thirties Charles de Gaulle wrote a book about the professional army.¹ It is notable now chiefly for its literary content, for as a military theme it was partially invalidated within two years—killed by Hitler's re-creation of the German National Army. Fuller and von Seeckt alike entertained this dream of a highly skilled hitting force which would restore the art of war. Fuller thought costs would keep the professional mechanized army to small size; Seeckt believed that the difficulty of the new techniques would prove the limiting

¹ Published in this country in 1941 under the title, *The Army of the Future*.

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factor.¹ But both men foresaw that it would not be possible to neglect the weight of numbers.

It is this weight of numbers which prefixes our problem. German military power is mobilized on the basis of a national army which is being mechanized and motorized at the maximum rate consistent with German means. Japanese military power, likewise. What they have done is the predeterminant of our own mobilization policy. With such powers loose in the world, the 'small but mobile professional army' is a concept of day before yesterday. It is not a force for American defence. Our frontiers are much too extensive for that. At most and least, it is a task force fitted to supplement another nation's military effort overseas. And for that it would never be used, for its very size would inhibit our bold use of it in the hour of strategic opportunity.²

Whence would come this professional army? All men are not born equal in the sense of fitness for war or capacity for the special tasks of war. We have come a great distance from the age when cannon were worked by civilians because soldiers did not have the requisite intelligence and fusiliers were organized to hold the civilians on the firing-line. To-day's soldiery is 35 per cent 'skilled labour'—a higher proportion than in almost any industry. A national army is a reflection of the intellectual and political condition of a nation, but must aim for a higher moral level, since the demands of modern warfare require a higher proportion of individuals capable of making decisions. Training in spontaneity of action, and the substitution of common sense for ritual, are the very foundation of the psychological preparation for mechanized war.

Were these things not so, the professional army would be attainable within the limits of our political system, for we could take such material as offered itself and by training alone raise it to the desired efficiency level. But we are in the position of the warrior Gideon who first had to raise an army of 32,000 men before he could reduce it to a band of 300 hand-selected individuals who routed the foe by superb execution of tactics. If our system of selection permitted us to draft a college backfield in-

¹ Seeckt's view is here quoted from *Landesverteidigung* (*National Defence*).

² President Roosevelt was speaking from this general view of the situation when he told his press conference on the 20th of August 1941, that the people do not realize that they have a war to win and that 'hard, tough fighting will be necessary to win it'.

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tact, install its Four Horsemen in an infantry tank, teach them the mechanics of the machine, and then order them to begin functioning as a unit, that would be a short cut to perfection. As it is, we cannot even hand-pick men from the factories to solve our tank-maintenance problem. Approximately 60 per cent of the mechanics in our armoured force had no civilian experience with the aeroplane engine and require schooling as technicians before they are useful as soldiers. The same percentage in the communications section are very raw material when they enter the service radio schools.¹

It is said of the South African War that every Boer was a horseman and therefore a potential mounted infantryman. Americans imagine that in the same way any truck driver can fit a tank like a hand to a glove and ride right off to war, failing to consider that a truck driver is usually road-bound and that a prerequisite for tank operation is an almost intuitive sense of ground. Though on Sunday afternoon the American countryside seems to teem with motor-cycles, half of our troops now training with that vehicle are getting their first dose of it, and half of the mechanics who work on their machines had never stripped a motor before entering the army.

That is the nature of the problem. Training is not only a matter of instilling youth with a soldierly spirit but of creating as well a technical corps out of individuals who have some special attributes of imagination, assimilation, skill, or character, for which there are no substitutes in the average disciplines of a peace-time military service. Only a national defence which is based on a national army can bring forth this corps in the required numbers and skills. Whether the whole can then be given a 'professional' combat efficiency depends on the quality of its leadership and the length of the training period. That kind of discipline which is the basis of an army, as Seeckt once remarked, is not acquired through knowledge but through habit.²

Armies do not bulk large in one age, and become smaller in the next because of somebody's whim or a prevailing military fashion. Their size is regulated by the condition of the society

¹ The author's percentages are arrived at from personal study in the service schools of the Third Army and especially at the Armoured Force School in Fort Knox, Kentucky, where his researches were generously aided by Colonel Stephen Henry.

² *Landesverteidigung*.

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from which they spring. They are large to-day because the machine is the basis of modern military power, and one of the largest of industrial nations—which is also the most terribly efficient military power on earth—has mobilized its total forces for world conquest. While Germany continues to win victories by linking a strong mobile force with the slow mechanism of a national army, it is arrant rubbish for any other power on this planet to talk of going into that sort of competition with a small 'professional' army.

In every German campaign of this war, mass has complemented mechanization. The mobile hitting elements and the slower foot forces have shared equally in the degree of success attained. The one could not have gone forward had it not been for the other. The tank requires the infantryman. Offensive power prospers in war only in the degree that it receives support from its defensive base. It is like the prize fighter who must have his feet on the ground and his guard up before he can swing on his opponent. His power is not in his fist alone but in his whole position, and to generate the maximum of force, it must flow through his whole body, even pivoting from the knees as was the style of Ruby Bob Fitzsimmons.

The 'body' of the modern defensive is the mass of infantry. As the evolution of mechanized war continues, the infantry will grow in decisive importance while changing radically in character. Motorization will give it greater radius of operation and gradually it will become the all-purpose arm. It will dominate the battle in areas where tanks cannot manœuvre, and for operation against tanks it will absorb the light field artillery. Its ratio of guns to man-power will be greatly increased.

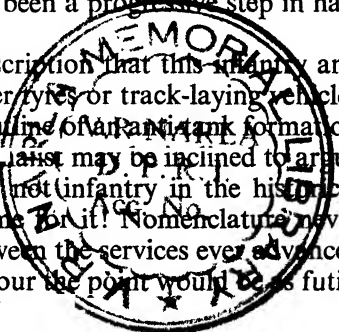
The time is almost here when proved necessity will eliminate from our military service many of the traditional barriers between its various branches which are a sweet boon to custom at the expense of efficiency. The self-sufficiency and coherence which is best represented by the United States Marine Corps is a working model for the army. For there can be no doubt that the infantry regiment of the future is organically a combat team of all arms. Armies will be organized in two wings—tank forces for offensive power and anti-tank forces for protective power, with the closest co-ordination of the two in all types of operation. In war on wheels, there is no other sensible balancing of

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military power on land. The tank seems likely to remain the dominant offensive weapon for some time to come, and therefore the organization of armies will change form and develop according to the requirements for two types of combat—offensive action with tanks and defensive operation against tanks. In the way that the infantry was based upon the artillery in the pre-mechanized age of warfare, the tank attack will be based upon the motorized and heavily armed infantry. This wing will be capable both of moving in offensively to exploit the penetrations by the armoured force, and of organizing and protecting the areas of defence into which the tank forces can withdraw from the superior forces of the enemy. This suggests something about the dual nature of the anti-tank wing's weapons. On the offensive, curved fire and direct-support artillery which is as mobile as the tanks are essential to manoeuvre. In the defensive, anti-tank guns, the 3·0-calibre machine-gun and quick-laying flat-trajectory artillery are the framework of protection.

This theme has been nowhere more pointedly stated than by Lieutenant-Colonel Thomas R. Phillips in the March 1941 *Infantry Journal*: 'The tendency of military organization to provide for small teams of all arms is the most important trend of the last forty years. It is the combination of arms that gives the infantry offensive capacity. American organization in the face of this trend has not caught up. On the basis of the evolution of tactics and its influence on organization, the American regiment should have been permanently organized as a reinforced regiment containing its own light and medium artillery, and engineers. Additional medium artillery, anti-tank guns, and anti-aircraft weapons should be available to the division. The reinforced regiment would be a proper command for a brigadier-general. Such a step would have been a progressive step in harmony with the evolution of war.'

Add to Colonel Phillips's description that this infantry and its weapons shall move on rubber tyres or track-laying vehicles and there begins to appear the outline of an anti-tank formation worthy of the name. The traditionist may be inclined to argue that such an all-purpose arm is not infantry in the historical sense. All right, coin a new name for it! Nomenclature never won a war, nor has jealousy between the services ever advanced their interests as a whole. To labour the point would be as futile



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as to debate whether to-day's soldier-equestrian is a cavalryman or a mounted rifleman, if it were not for the fact that in the historical roots of the separation of the services are to be found the most cogent reasons for their reunion.

In the army of Gustavus Adolphus, sometimes called the father of artillery because he was the first to give it its true position in the battlefield, the field guns were distributed among the infantry regiments, and were fought from the foot formations by civilian gunners. Gustavus lightened and standardized field pieces, and improved their carriages, so that they could manœuvre with infantry. His battles were founded on artillery power and elimination of the disparate movements of the guns and the foot troops who gave them protection.

Until Gustavus Adolphus began his reforms, armies had almost lost their locomobility. It was the most ponderous age in all warfare. Armour was still in vogue, but had been given so much greater bulk to afford protection against musketry fire that men could hardly move about in it. At last it passed from the battlefield because its weight had become insupportable. Artillery in that age had neither battlefield mobility nor protection. The guns were so immobile that it was taken as a matter of course that they should change hands after a battle. The first field artillerist, John Ziska, the blind yet clear-visioned Hussite leader, had started the artillery on the right track by working his light batteries from within the protective circle of his wagon-laager during his battles for Bohemia (1419-24) but during the next two centuries his principles were tossed to the winds.¹ The guns were made larger and heavier, and consequently less manageable. They were moved up to battle in ox carts, and usually went into action ahead of troops. Thus all manœuvre was limited by their weight. During battle, they were manhandled. If the troops advanced, they were left far in rear. If the troops retreated, they were either buried or abandoned outright. Armies went rooting around after guns like dogs after bones.

To repeat, Gustavus Adolphus re-established the vital principle of mobility, and the Great Captains who followed him

¹ General Fuller suggests that the student of armoured force strategy cannot do better than return to the battles of Ziska for study. He refers again and again to the principle of the wagon-laager in his book *F. S. R. III*.

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adopted his plan of an essential tactical unity between infantry and the mobile guns. In Marshal de Saxe's *Rêveries* there is the note that the light field piece—the amusette—should be fired by infantry. In Turenne's army, where the science of military engineering came into being under the leadership of Sebastien Vauban, there was a 'recurring struggle to make men of war perfect in the practice of their profession'¹ and to stake the fortunes of war upon sharp and decisive action. Siege warfare had been the prevailing military doctrine and likewise one of the most popular forms of public entertainment.

This rather monstrous appetite Turenne cheated by directing his vast powers as an organizer (no commander ever laid greater stress on the value of personal reconnaissance) to the development of extreme mobility in relatively small forces. He was given to the use of his infantry in feint attacks, rapid night marches and surprise descents upon the enemy camp. But when he joined battle, his artillery fire was delivered 'like a blast from hell' from in front of the infantry line. This was the period of transition from small armies heavy in cavalry to large armies in which infantry was the preponderant arm, a change which had occurred largely because cavalry had armoured itself into a state of immobility to resist infantry weapons, and so had become incapable of offensive action. Turenne restored and husbanded the cavalry, and as an unarmoured force having high mobility, it continued as the decisive arm for several hundreds of years thereafter. In fact, the break-away by which artillery became an independent military force, separated from the infantry, dated from Frederick the Great's creation of a horse artillery to keep pace with the movements of cavalry.² The French artillery expert, Gribeauval, built on Frederick's work by systematizing artillery organization both as to personnel and material.

Such were the conditions under which the arms went their separate ways. From Turenne until Ferdinand Foch, separation was a highly proper principle. Movement in all of its forms, then as now, was the chief problem of military operation. Weight was the eternal drag upon movement. All force was carried forward by muscular power, and tactical co-ordination depended upon uniform delivery of its variously weighted elements on the

¹ *Turenne*, by General Maxine Weygand, Boston, 1930.

² *Encyclopædia Britannica*.

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battlefield. But the advent of the petrol-engine revolutionized conditions. When the full-surfaced highway and the roadless vehicle came in, the heaviest of military equipment and the hitherto least mobile of the weapons were enabled to keep pace with the rest. Indeed, they became the pace-setters for all of the mobile hitting elements. Artillery on self-propelled mounts could move over a clear highway at speeds upwards of forty miles per hour. Placed upon track-laying vehicles, it could cut across country and perhaps reduce the radius of operation by half, as could the tracked Bren-gun carrier, or for that matter the tank, which is nothing but artillery on an armoured gun mount. These changes in movement altered every proportion in war right down to the tactics of the squad. They re-illuminated that little-understood truth that while the nature of war changes according to the change in weapons, the weapons themselves change because of a change in civilization, and not on their own account. A roadless Europe was a cavalry battleground. As it became agriculturalized and the road came in, infantry predominated. In turn, its industrialization produced the mechanized army.

As new weapons influence tactics and strategy, so they should react even more immediately upon administration and organization. But it is here that the greatest resistance to change occurs. 'Adherence to dogma has destroyed more lives and lost more battles', J. F. C. Fuller has said, 'than any other cause in war.'¹ The greater part of the damage, however, is an inheritance from the traditionalism of peace-time soldiering. Each of the branches works toward perfecting and protecting itself within its own water-tight compartment, contends jealously for what it deems its special prerogatives and so sets up a resistance to changes in command and organization which are at variance with the accepted standards of training. Nor is it the old-line soldier only who refuses to cultivate that plasticity of mind which is so desirable in the military commander. The Air Force officer who has a low opinion of infantry thwarts the principle of co-operation and opens the door to such tragedies as the one at Crete. The Armoured Force officer who scoffs at the idea that cavalry has any place in war fails to reckon with the fact that there is no other arm so well fitted to cope with the modern problem of the mass exodus of civil populations from cities under air bombing,

¹ *F. S. R. III.*

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which chokes the manœuvre of the defender and makes possible the act of annihilation. Long-distance reconnaissance, the masking of an infantry advance, the cavalry charge—these uses of cavalry have been relegated to limbo by the rise of air and mechanized power, and the authority of the automatic weapons. But so long as disorder is the inevitable accompaniment of war, and so long as there are flanks towards which motorized vehicles cannot travel because of the forbidding nature of the ground, cavalry will have its distinct uses.¹

We have all heard about the need for mobility in war until we are ready to gag on the subject, but little account has been taken of the difference between mobility and speed. In this difference is to be found the key to the future. Battlefield mobility, which is more important than the ability to move fast, is still the talisman of military success. Battlefield mobility, however, is merely the dynamic of an essential tactical unity. Speed itself solves none of the problems of war. If the race were always to the swift, then long before now the aeroplane would have blotted out the last land army even though on the ground it is tactically the least mobile of all weapons. The principles of war remain unchanged. Economy of force, concentration, surprise, security, offensive action, and co-operation hold good whether an army is composed of foot soldiers, horse soldiers, or machine soldiers.² The attainment of certain of these ends (concentration, security) has been made more difficult by motorization, and rapid movement and speed themselves run counter to the efficient articulation of the entire force.

Therefore in an era when all military operation appears to be dependent for success upon rapidity of movement, but without sacrifice of the initiative or any loss of control, the index swings past the limited principle of co-operation between the branches, and points to the need for a grander unification of certain of the combat arms. To-day it is the infantry-artillery combat team. To-morrow it will be the artilleryized infantry. Thereby will be

¹ On the 17th of August 1941, on the Leningrad front, a regiment of Russian cavalry routed two battalions of German S.S. troops and drove them back ten miles during a German attempt to extend the position by a night march. The horsemen, dismounting for battle, wore white arm bands to distinguish themselves from the enemy in the dark, after coming in on the German flank.

² These principles, as General Fuller wrote so prophetically in 1932, were the only things which would endure and which the forces of the future could cling to.

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restored to the defensive artillery some measure of the protection, once afforded by the deployed infantry forces, which was lost through the rise of tank power. The guns will move and come into action within the protective circle provided by the motorized infantry. Months ago it became known that the United States Army has authorized the first experimental division in which infantry regiments, completely motorized, are to have the self-propelled 75-millimetre howitzer as an integral weapon. This is the first promising sign.¹

In passing, it is worth noting that what I have called the anti-tank wing has the predominant characteristics of infantry. Its primary offensive mission will continue to be occupation of the ground and exploitation of the success after the tank attack, which was the general use made of infantry in the German campaigns over France, Greece, and Russia, the term 'exploitation' including direct offensive action against the enemy factions

¹ For these reasons, the Fourth Motorized Division is, in the opinion of the author, the most interesting military organization in the United States. According to the War Department memorandum, its reorganization plan calls for the introduction of a self-propelled 75-mm. howitzer as an integral weapon of the division's infantry regiments. Such a gun would be mounted on a track-laying vehicle ready for instant fire in any direction.

Other features, quoting the memorandum, are a 'large increase in reconnaissance strength, including a substantial force of light tanks and a company of bantam cars; a battalion of medium tanks; a considerable reduction in the number of riflemen; an increase in anti-tank guns and the introduction of 37-mm. anti-aircraft guns in the motorized division for the first time.

'The reinforced reconnaissance force of the division enables it to provide strong combat patrols over a wide front and at a great distance from the main body. The proposed reconnaissance force will be a battalion of four companies. Two of them will be light tank companies. One will be a company of thirty-six of the versatile bantam cars. The fourth will be the weapons company, equipped with anti-aircraft and anti-tank guns and machine-guns to enable it to function as a supporting and protective unit.

'Significant changes have been made in the infantry. As in the present Fourth Division, there will be three infantry regiments, but their power of attack and defence will be considerably augmented. Each of the new regiments will consist of two rifle battalions and one support battalion. They will have only about two-thirds as many men as the present regiment, but their weapons will give them greater fire power. Each rifle battalion will consist of two rifle companies and a weapons company. The weapons company will be equipped with machine-guns, light anti-tank guns, and 81-mm. mortars. The chief changes are in the third or support battalion. It will be this unit which will have one company of accompanying artillery—six 75-mm. howitzers. It will also have a company equipped with sixteen 37-mm. anti-tank guns and another of '50-calibre anti-aircraft machine-guns.' The memorandum concludes: 'The present engineer battalion will be enlarged, particularly as to its bridge-building facilities. The quartermaster battalion will be augmented by the addition of one truck company and expansion of the present gasoline supply and motor maintenance platoons into companies.'

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created by the armoured assault. The major components of this anti-tank wing will fight afoot, for its vehicles are not intended to provide it with tactical mobility, and such armour as it possesses is primarily for its defensive protection, especially against enemy aircraft.

Its strategic aim will be to get to ground where a superior fire can be directed against enemy mobile forces, while its tactical method will be to go to ground as it brings this fire to bear. Assuming that it will endeavour to take up positions where it can screen its own armoured forces while working enemy tanks into area where they will manœuvre against their kind under conditions of general disadvantage to the latter, this new infantry must acquire as complete a knowledge of ground with respect to its availability or unsuitability for all armoured force operation as have the armoured forces themselves, and this knowledge must flow through to the leadership of the smallest tactical units. Because the motorized infantry will be made one of the chief targets of the enemy attack aviation, it will require its own anti-aircraft sections. To meet the danger of attack by parachute troops against its own static defensive positions, it must learn what no infantry has mastered up to now—to organize the defensive position from the interior outward just as if it were a blockhouse or an island approachable by the enemy from all sides but capable of defence whatever the approach. The primary defence against paratroops is an air-force problem, but secondarily the task of the motorized infantry.

We have here a complex of duties which can be discharged only by troops of the very highest order, leading probably to a division of infantry forces into first- and second-class categories, the one motorized and the other not, the one engaged in battle missions of the greatest strategic consequence, and the other entrusted primarily with pioneer and house-keeping duties. Police work, the protection of rear-area communications and the preparation of fortified centres and defended depots in the conquered area during periods of active operation will devolve upon the unmotorized infantry, since the motorized force, when fully established with artillery, will closely support the armoured force in the advance and at the halt will organize the protected area for the tanks and the other hitting elements, as well as the maintenance services.

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We have seen this relationship approximated in battle sectors where tank operations stalled, for example, around Solum and Tobruk. The tanks withdraw and the defensive front is established by the anti-tank elements. As a security principle, the use of the anti-tank wing for protection during the sustained offensive would appear to be not less desirable than in the protracted defensive, provided that it has the requisite mobility and gun power. The armoured divisions to-day include their own protective and anti-tank elements. But a much more elaborate screen, which would permit greater depth in the organization of the protective base, supplies an additional margin of manœuvre which the tanks can well use in counter-attack against the flanks and rear of the enemy. It is by the same principle that the attack in football has better chance of gaining momentum for an end run if the formation starts some distance behind centre.

In operations between mechanized forces it would seem, moreover, that the defensive position is more apt to be vigorously maintained by forces trained to believe in the stopping power of their weapons, and who think of the defence against tanks as something more than an unhappy but brief interlude preceding retreat or counter-attack. The art of correct fighting depends upon the closest combination between offensive and defensive action and successful battle depends upon how far this combination can be maintained. Victory depends upon maintaining it, and defeat results from not being able to do so. With the war's development, the effectiveness of armoured force operation will be regulated more and more by the strength of the defensive base.

One final note regarding the history of the former union of the artillery and infantry might be appropriate to this prophecy of their re-marriage. The rift between them developed about one hundred years ago through the agency of Thomas Shaw, the Philadelphian who invented the percussion cap. Gunners and riflemen had fought side by side in the Napoleonic period and the War of 1812 because the inconsiderable range of the flintlock musket offered very little threat to troops in line, and battles were customarily decided by the bayonet charge. It took the armies about twenty-five years to appreciate the advantages of Shaw's invention, but after they once got the point, improvement in the rifle and in gunpowder came rapidly. The

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French Minié Rifle, introduced about 1850, was sighted up to one thousand yards. By that time the artillery, which was especially vulnerable to the high-powered bullet because of the gunner's inability to employ cover, had faded far back from the infantry line. With each improvement in the rifle, he withdrew farther from the front. As he moved, his own guns had to be given increased range.

These tendencies rocketed to their inevitable climax in the World War of 1914-18, when the multiplication of automatic fire gave the bullet full reign over the field of battle, an authority which the greatest concentrations of artillery power could not shake. Napoleon's remark, 'It is with the artillery that war is made', once the words of genius, were mocked by a situation in which it was sometimes necessary to throw hundreds of tons of high-explosive shell against a few yards of barbed wire to permit infantry to advance against infantry.

The bullet suggested bullet-proof armour and armour suggested the use of an immunized vehicle which could bridge the space dominated by rifle fire. When the tank came into being, the bullet went into decline. As J. F. C. Fuller has expressed it: 'General Swinton conquered Hiram Maxim.'¹ A rolling pill-box at first and a crushing force only against infantry forces, the tank took on more armour and gun power, and with greatly increased mobility became a charging fortress capable of attacking and subduing the static artillery.

In their single state, neither the infantry nor the artillery now has the tank's respect, and they must get together again if their united strength is to prevail over the common enemy.

¹ *On Future Warfare.*

6. Tanks Can be Stopped

And the Lord was with Judah ; and he drove out the inhabitants of the mountain, but could not drive out the inhabitants of the valley, because they had chariots of iron.

The Book of Judges, Chapter I, Verse 19

There is an interesting if not altogether reliable analogy between the modern use of armour in war and nature's use of it on the antediluvian monsters that once ruled the earth. The monsters succumbed when smaller forms of life evolved whose agility more than made up for their lack of armour. The big armoured reptiles found their prey too swift for them and themselves fell prey to livelier competing species.¹

Battleships likewise have grown steadily bigger and heavier in defence against each other, and more vulnerable to livelier foes. Not yet extinct by any means, their habitat nonetheless has been restricted by the swift and hard-to-hit bombing planes, as well as by the lurking submarine and the little-ried 'mosquito' torpedo craft. On land, the tanks will follow this same evolutionary course. They grow bigger, more heavily armoured, and in the long run slower. They are invincible now in the sense that apparently nothing can stop a blitzkrieg column except another bigger and tougher armoured force. But it is safe to say that the tank's present degree of invulnerability is at best and worst a passing phase. Man's ingenuity, like nature's, will catch up with it. The greatest tank authority of all, Major-General J. F. C. Fuller, while making the foremost single contribution to the development of the tank's offensive potential, clearly foresaw the workings of this principle ten years ago when he wrote: 'The tank, an essentially offensive weapon, because of its ability to attack will at once react upon the protective idea, forcing it into first consideration. And this protective idea, leading to the construction of elaborate zones of defence, will through cost react upon the offensive idea by limiting the number of offensive weapons.'²

¹ For this idea thanks are due my colleague, Karl Miller, Editorial writer for *The Detroit News*.

² *F. S. R. III*, by General J. F. C. Fuller.

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As the Macedonian Phalanx begot the Roman Legion, less powerful but more adroit in manœuvre, the tank will beget forces which will first neutralize it, and then defeat it. This has been the history of armies and of weapons since the beginning. No new weapon can be introduced without changing the conditions, and every change in condition modifies the application of the principles of war. Each weapon is influenced by ground, time, and space, as well as by every other weapon. As new conditions are established, these react upon the power of weapons. The calculations entering into the choice of targets and of instruments to be used against them are matters of strategy rather than of tactics.

On the tactical side, however, it is clear that there are but two supremely important problems presented to the mechanized and motorized army. The first is to keep one's own tanks and armoured cars moving into enemy country; immobilized mobile power is only one step short of annihilation. The second is to forestall occupation by the enemy by compelling his mobile forces to assume the protracted defence.

It is the more curious, therefore, that to-day the offensive and defensive are not considered as separate and yet equal portions of the problem as a whole. The present concept of mechanized war is that of the *offensive à outrance*. The defensive doctrine in some circles of the United States Army runs counter to the long view, and the jargon of the schools supports the belief that the tank is unconquerable.

'There is no way of stopping the tank except to out-tank the enemy.' 'Tank obstacles and mine-fields, when covered by heavy anti-tank fire, may delay or reduce but cannot stop or turn the armoured attack.' So runs the teaching after two years of war in Europe during which the German Army has had such unquestioned air superiority in all stages of every offensive that there has been no opportunity for a comprehensive evaluation even of the static artillery defence against tanks. Through the co-operation of the German aviation, artillery, engineers, and infantry, the defender's anti-tank arrangements have frequently been defeated before the attacking tanks challenged the position. Key points on the Western Front, for example the fortified Hill 505 at Montmédy, attacked on the 19th of May, 1940, have been captured without any use of tanks whatever.

Speak of Hannibal, however, and the average student of mili-

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tary affairs is quite apt to reply: 'Elephants!' In the same way, the observer of things in the present has become so fascinated by blitzkrieg's thundering chariots that he ignores, or discounts, the extent to which the excellence of the co-operating services made possible victories seemingly won by the tank. The result is that the tank doctrine tends to drive out all competitive ideas, not only among laymen trying to understand the war, but among soldiers engaged in doing something about it. Lecturers in our army are to be heard enunciating the singularly incompatible ideas that (1) anti-tank troops must be endowed with the highest possible morale, and (2) they should understand that they have no chance to score a real success over the enemy.

Britain tends towards the same dogmatic view that really nothing can be done about the tank. 'Is it not true', asks the British critic, Donald Cowie, 'that eight campaigns in this war have proved the tank irresistible?'¹ A fair enough question considering the unanimity of the failure of anti-tank defences, but let us answer rather that it is true that the war has lasted but two years, that it has been a war of development, that during the first year the effectiveness of the aviation-armoured force team of Germany went unappreciated or was underestimated by the Allies, that the interval since has been all too short for the anti-tank forces to obtain a sufficiency of tank-stopping weapons, perfect anti-tank vehicles and re-establish their principles of operation. The fighting in and west of Smolensk should be a landmark in mechanized history, for it was not until the Russians stood on ground within the U.S.S.R. proper that there was a defensive against tanks in this war which did not warrant the term 'makeshift'. On the point of the scarcity of weapons one recalls the ringing declaration of the soldier-parliamentarian, James Henderson, returning from the tank battleground of the Libyan Desert in June 1941, to tell the House of Commons that: 'Thousands upon thousands of British soldiers in the Middle East have died because they were denied weapons with which to defend themselves.'

Throughout the war we have all been quick to see the obvious, but in war the obvious is rarely, if ever, a complete truth. A former book² cites the fact that members of the United States

¹ *The London Sphere*, the 24th of May 1941.

² *Blitzkrieg*, by S. L. A. Marshall, New York, 1940, p. 135.

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Congress adjudged the Battle of France simply as an object lesson in the supremacy of air power. Subsequently the campaigns in the Egypt-Libya theatre focused extraordinary attention on the armoured force weapons, and the indispensable role of air power in these operations was proportionately slighted. When the Battle of Greece was fought, the correspondents and military commentators almost unanimously sounded the warning that superior concentrations of heavy tanks are certain to be decisive against mechanized forces depending mainly on the faster but lighter-hitting armoured vehicles. This was an over-simplification which ignored the composite character of most tank battles, and discounted the tactical dependence of the heavy tank upon the lighter members of the tank swarm for offensive reconnaissance, the seizure of bridgeheads and protection against demolitions, and the expansion of the attack throughout the rear areas. Without these operations, there could be no decision. Without these lighter forces, which bear a relationship to the heavy tank approximating that of the destroyer-cruiser screen to the line of battleships, the heavy break-through tanks of the G.H.Q. reserve, having limited speed and therefore little 'finding'¹ mobility, would either become pieces of static artillery, or could be manœuvred into ground where they might be starved of petrol or destroyed by the defending guns.

'The civil comparison to war', General Sir Archibald Wavell has written, 'must be that of a game, a very rough and dirty game, for which a robust body and mind are essential.'² Thus justified by such eminent authority, one need feel no hesitation in comparing the mechanized offensive to the attack in football.

The heavy tank is the fullback running interference for the lighter and faster tanks, which are carrying the ball. The mobile and artilleryized infantry is the opposing line, while its own armoured wing represents the secondary defensive and the hitting forces of the counter-attack. The ends of this line also have offensive uses in operations against the enemy flanks. The all-important problem of slowing down and then stopping the running attack is one of destroying in some manner or other the cohesion of the striking elements, whether by blocking-out the interference or side-stepping it and permitting it to run on into

¹ As distinguished from 'hitting' mobility.

² *Generals and Generalship*, by General Sir Archibald Wavell.

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the secondary defence, while getting at the man actually carrying the ball. The result in either case will be a down with no gain. The relationship of speed and weight to hitting power in these two greatly different forms of attack is very much alike. By the Napoleonic maxim: 'The strength of an army, like the momentum in mechanics, is estimated by the weight plus the velocity.'¹

Because the heavy tank is protected by the thickest plate and is therefore the most shell-resistant of the armoured vehicles (roughly, an inch of armour will stop a shell one inch in diameter) it by no means follows that the fluid infantry defence against tanks will fail unless the co-operating armoured forces can match heavy tank against heavy tank or stop the breakthrough force with heavy armour-piercing shell and air bombardment. The point of utmost vulnerability in all armoured force operation is the factor of movement which enables it to win swift decision. Tactical power is the product, not the sum, of material power and mobile power. It has always been so in any battle and tank armour hasn't changed it. The moral should be as clear to-day as it was after the Battle of Bullecourt, on the 11th of April 1917, when British tanks tried to go forward in line with Australian infantry, and by slowing themselves to the latter's pace, became a bull's-eye which enabled the Germans to pour a crushing fire into the whole target. Says Brigadier-General E. L. Spears in a note written on the spot: 'The tanks were the targets of every hostile gun to such an extent that their neighbourhood became an inferno from which the infantry fled.'²

If in modern war the mobility of the total mechanized attack can be reduced by destructive fire upon the lighter elements, then the motorized defence can be regrouped against it, as during the great offensives of the World War automatic fire power was regrouped against the slow-moving infantry after the artillery bombardment had fragmented the defensive lines. Therefore, in the consideration and preparation of a defensive position designed to stop the enemy armoured attack absolutely, the utmost precedence must be given to defence against his most mobile elements, and the ground must be examined and organized in relation to the object. In the discussion of 'elasticity' and 'depth' in a defensive area organized to 'catch the striking force in a bag',

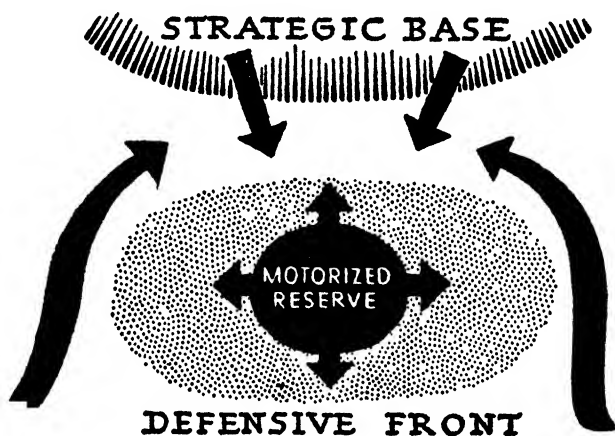
¹ The ninth maxim.

² *Prelude to Victory*, by Brigadier-General E. L. Spears.

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all of which terms are too general to be satisfactory, the value of a highly mobile anti-tank reserve established with due regard to the vulnerability of flanks and rear, cannot be over-stressed. So long as this force remains alive and able to manœuvre, the position is not broken. Around this mobile pivot, the whole defence expands, contracts and moves as occasion demands.

Observation of the enemy being the most important reinforcement, the tactical employment of the mobile reserve will depend



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in large degree upon the information supplied by the air reconnaissance on enemy armoured force movements. The principle of its employment, however, is the maintaining of contact with and defence against the enemy's more mobile elements. The heavily armoured vehicles cannot obtain victory by penetrating the defensive front. Break-through and decision occur only when, the light tanks find and destroy the mobile reserve. It is self-evident that the anti-tank wing should be so weaponed and vehicularized as to defeat that object. Lacking armour and therefore being more vulnerable though less costly than armoured force, it must excel in numbers if it is to compete with the tank in 'mobile power', which in the tactical sense means simply the ability to deliver at a distance in a given time.

Oddly enough, very little attention has been drawn to the

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peculiarly inorganic nature of the offensive arrangements in present-day armies. The general advance of a 10 to 20 per cent mechanized army might be likened to the spring of a snake, lightning fast in front but limited in striking radius to three-fourths of its own length because of the weight of its body. In no other period of warfare has there been such a tremendous differential in the rates of movement of the hitting forces and their means of defensive security. Alexander the Great's heavy cavalry was based upon the Phalanx—a slow-moving forest of pikes. John Ziska, the blind Hussite, in fighting his battles for Bohemia, carried his infantry into action in farm carts, first drawn by oxen and later by horses, then formed the carts into a wagon-laager upon which his foot troops could retire when hard pressed. In the World War, the infantry was based upon the artillery. In the present war, the tank operations—which are movements of self-propelled and self-protected guns—are based upon an infantry which has neither enough anti-tank power to afford the tank a proper defensive protection nor enough strategical mobility to keep pace with its advance. The modern army has become a 'sword without a shield', to quote Fuller's words again,¹ continually courting the danger of excessive immobility through over-extension.

The primary result of increased mobility in the tank was the speeding up of the attack and the divorce of the tank from the infantry. Relieved from the necessity for covering the infantry advance, tanks began to operate over a greatly widened front. Instead of the close order of attack which was employed in the World War battles, they advanced in open order, that is, with a considerable distance separating each group of tanks and likewise separating the objectives of each group. Tank operations in the present war have all taken this form.

In all attacks by mechanized infiltration time is the decisive factor because, unless the fragmentation of enemy resistance points is more rapid than the regrouping of the defending elements and the reorganization of defensive areas, the penetration fails. By such failure, the battle is restabilized under conditions which are inimical to the armoured striking force, since its protection decreases as it loses momentum. 'The objective of modern strategy is to bring about a decision with highly mobile forces

¹ *F. S. R. III.*

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without or before the masses will be brought into motion.¹ But when forceful action fails, by committing advancing mechanized forces to within effective enemy range without adequate security or concentrations sufficient to obtain decision, the battle can be made fluid again only by the successful action of the infantry forces. Tanks are no exception to the rule that no arm is independent of the others. Each has its powers and limitations, and the correct combination is that which arranges the whole so that the powers of each offset the limitations of the others.

It is clear, therefore, that while tank penetrations may have decisive influence upon the battle, as in the attack on France or in the Balkan campaign, the speed which enables them to plunge far ahead of their own infantry is an element of danger which can react towards the immobilizing of the total force. This happened in the advance from Minsk to Smolensk. Against defensive bodies which remain tactically coherent, the mere penetration by armoured forces of the enemy country may have as little consequence as J. E. B. Stuart's cavalry ride around the Union Army. The comparison will not seem inappropriate when it is remembered once again that the tank alone is not likely to demoralize properly trained and well-positioned troops, and that without close support from the attack aviation, it loses much of its shock power.

Let us try to imagine an elaborate zone for defence against tanks organized according to the general principles which von Lossberg² introduced on the Western Front in 1917. The defence forces are deployed considerably in depth, perhaps as much as fifty miles, with anti-tank guns distributed over the area. The mobile reserve is ready to cover the breaches. The whole position is organized in strong support points, and the total of its forces is prepared to destroy systematically if compelled to retreat. To the rear of this tactical base, organized for the battle, is the strategic base where the defending armoured force stands by, ready to launch the counter-attack which will have treble the impact if timed when the enemy is under the impression that he is pursuing a beaten foe. In this situation, the farther the attacking mechanization moves from its base, the more it feels the grip

¹ As Hans von Seeckt is quoted in *Landesverteidigung*.

² The strategist who in the closing days of the war, following Ludendorff's collapse, took over the direction of German operations.

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of supply and the greater becomes its danger. An overnight shift in the weather may reverse its fortunes by grounding its air support. Increasingly, the tank forces will have to turn their attention to preventing the areas of communication from being attacked and closed, and to improvising new means of self-protection. Their penetrations have, in effect, become narrow salients with much of the old-time hazard of narrow salients, and have served to equalize the battle by returning it to the infantry.

This example illuminates, I believe, the essential point of difference between Sedan and Smolensk. In the attack on the Western Front the German panzer divisions were never as far from their mass infantry support as during the July 1941 fighting in White Russia. A number of factors combined to produce a deviation from the order of attack which elsewhere had proved successful, among them being the vast spread of the Russian frontier, the greater depth of the Red Army defensive position, and above all, a growing tendency in the German command to hold its foe too cheaply. Surprise, and its derivative—shock in this case—were not sufficiently intense for the offensive to be opened with any extraordinary or overwhelming advantage. Consequently, the campaign in Russia became the first conclusive test of whether an armoured force has the ability to win large-scale battles in complete detachment from other ground troops under modern conditions.

Along the Meuse River, May 1940, the co-ordination of German tanks and the follow-up infantry was sometimes so close that the foot troops were first through the resistance line. The French cavalry brigades and light machine-gun elements which were sent forth to stop the attack were cut down like grain by a well-oiled reaper. The Red Army defensive along the Dnieper was not similarly blighted by a wholly false view of the problem. Whatever their failures, the Russians saw their task clearly enough. Though the German Army communiqués made much point of the fact that the mechanized attack had moved '100 miles beyond the German infantry' in the advance towards Moscow, this very separation prevented concentration, stalled the offensive, multiplied tank losses, provided the Red Army with an opening for counter-attack and brought the whole German movement dangerously close to collapse.¹ In the beginning it

¹ This was the state of things in the last week of July 1941.

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had been easy enough for the German tanks to go thirty or forty miles in a day when defences in towns and in woods could be by-passed because there were great spaces of undefended terrain on either side of them. But they overlooked and underestimated the dangers of a hostile countryside in so doing, and their passage did not produce a general terror nor did it put them on the rear of the defender's forces of counter-attack.

Later on, when the operation began to wobble and slow down, the German command spoke disparagingly of the 'localized' resistance of the Russians, an invidious discounting of the principle that when area defence becomes the order of battle and anti-tank weapons are grouped around strong points for the purpose of reducing the attacker's mobility over a wide countryside, resistance is certain to have a decidedly 'localized' appearance. These German pretensions did not conceal how grievously the attack had miscalculated. The 'gap of dislocation' had once again appeared in a German centre and the Dnieper might have become a second Marne had the Russians been prepared to take full advantage of it.

The point is that Germany's whole campaign was jeopardized by not having enough divisions of infantry on rubber tyres. Admittedly, the Germans have set the pace for all other armies in this regard. However, there is such a thing as the 'maximum of motorization' that even a great nation can maintain in the field, and as supply must always be the first consideration of armies, the German infantry still lacks the degree of motorization which would enable it to move decisive bodies of troops into the largest theatres of action at the same speed as the armoured combat vehicles. Germany, with 1940 conceptions of how to make war and with what weapons, still does not have more than thirty motor-propelled divisions.¹ In this establishment the ratio of motorized infantry divisions to armoured divisions (some authorities quote it higher) is believed to be about one to two. This ratio is the one weak link in the German chain of force and is doubtless due to economic factors, such as the controlling one

¹ The German Army is supposed to have reorganized its armoured divisions for the Russian campaign, using smaller numbers of tanks for each division. This is the way the new German armoured division was reported to be organized: A headquarters company, a reconnaissance unit, a signal group, an artillery regiment with 105- and 77-mm. cannon, an anti-aircraft regiment, an engineer regiment, an air unit, mobile heavy anti-aircraft, a tank brigade of 416 tanks and a motorized infantry brigade of about 2,000 men.

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of petroleum supply, rather than to the making of wrong guesses about the evolution of war between mechanized and motorized armies.

So the moral of this chapter is the very simple one that a large part of our salvation is to be found in the automobile factories, and the engineering brains, of Detroit. As Otto D. Tolischus, the distinguished foreign correspondent of *The New York Times*, has remarked, the present war, whatever kind of war it may be, is primarily a war of motors. In the production of these vital parts of a mobile military force as well as in the production of the fuels upon which they feed, the United States should be able to play the trump card.

The foot soldier must be put on wheels right up to the limit of the need or of our ability so to place him. If we are to continue to load the infantryman with anti-tank weapons, thereby lessening his power to move tactically across ground even as we see his urgent need of yet heavier weapons, then we owe it to him as well as to ourselves to put him in a motorized carrier so that he can get his weapons up to the battlefield.

The orthodox Field Service Regulations concept of infantry as the force which 'closes with the enemy' and 'completes his destruction in close combat' is due for a considerable modification, if it does not die outright. The strength of the motorized infantryman under modern conditions of warfare is that he can surprise. His weakness is that he cannot close. The more that the employment of armoured striking force superinduces the use of armour and heavier guns in area defence, the less becomes his ability in this direction. He can worry his adversary to death but he cannot strangle him.¹ However, in a full working partnership with the armoured forces he becomes the means of assuring the continuation of the offensive as the stronger form of war by providing the major elements of the attack with the judicious protection which is the only surety of the final victory in which they will share mutually. The infantry remains the principal arm, but not the arm of decision. It must be made complete by the tanks and aviation.

Only a balanced army, in which mobility and power in the anti-tank wing give it a velocity approximating that of the tank wing, can stand the stress and strain of unexpectedly prolonged

¹ Fuller's words in *F. S. R. III*.

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periods of operation. This is not only a tactical matter but a moral one. The restoration of armour to military forces has not over-ridden the favourite military adage of Englishmen that 'there comes a time when the gun counts less than the man behind it'. The fighting spirit of the soldier still counts most in war. Machines are only implements for it. For expressing ideas of this sort, the War Department has been ridiculed as antediluvian by some of the bright boys of the Washington press gallery,¹ but in the present warfare, more depends on the initiative, spontaneity, and endurance of the individual than ever in the past.

One of the blessings of the mechanical wars, as military men regarded the subject in theory a few years ago, was that troops would be relieved from fatigue and operations would not labour against the inertia which settles over military forces after nerves and bodies have been exhausted in battle. There would be no slow-down during the crisis of campaign. A button would be pressed or a lever shoved forward. Then presto, chango! the army would recover its forward speed. All of the shock and strain would be taken up by the levers and gears. Bivouac would be a period for leg-stretching and snoozing in between long romps into the countryside.

These things it was calculated the machine would do for the human element in battle. It was supposed to be a refining influence, preserving man-power from the slow torture of moving from a forced march into a grapple for life and death, as happened in the muscular wars. 'Generalship would replace brute force and the attack on nerves would replace the physical dog fight.'² But in their whilom and happy considerations, the prophets of armoured mobile power overlooked the working of one principle which Germany's earlier swift successes all but obliterated until the development of the Russian defensive threw it into bold relief. The machine, however employed, does not lessen the need of getting there first with the most men, or fighting units, long recognized as an aphorism of war. That means

¹ Ridiculed, also, was the fighting creed of the infantry soldier as given in the *Infantry Journal*, July 1941: 'The infantry mind is a mind which thinks men are the essence of fighting, that the hearts, guts and blood of soldiers win wars, that bombers, tanks and jeeps; howitzers, guns and mortars; grenades, pursuit planes and rifles—are tools in the hands of men, of fighting men, and can never win wars by themselves.'

² *F. S. R. III.*

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movement, and it is movement in its various forms which is the chief strain upon men as upon armies.

To-day's soldier is on solid ground when he says the World War man didn't understand the half of battle fatigue. The nature of mobile power necessitates that movement be continuous. Information—that is, knowledge of the enemy—is the foundation of battle, and the faster the rate of strategic movement, the more protection becomes dependent upon it. A chief characteristic of mechanized war is that its strategy is inconspicuous. The major hitting elements are less dependent on communications and can therefore come up rapidly from far in rear or shift under cover of darkness laterally across their own front to develop the offensive in a totally new sector. The effect is a constant flux of situation necessitating that reconnaissance (the business of finding the enemy) be maintained unceasingly over great distances. Security cannot be made sure by air observation because of the ability of large tactical bodies to manoeuvre under the screen of darkness, fog, or rain. In the role of maintaining contact with the enemy the motorized swarm—employing some such vehicle as our present one-ton cross-country blitz buggy—will in future war become increasingly effective. 'Within this swarm the army will move and rest, the swarm thinning out in front and thickening on the flanks as the enemy is neared.'¹

Once battle is joined, the effect of mechanization, as the German campaign in Russia has shown us, is that the armies become locked and the general engagement cannot be broken off. When slowed, the elements of attack must try again, or move towards some new salient of exploitation until full motion is restored. The deadliest thing about our modern style of warfare is that men and machines must keep going. It is battle to the death. No commander dares say: 'We've had enough now. We're nearing the rope's end. Let's rest a moment and catch a breather.' He knows that his most ponderous elements, the backbone of his army—the unmotorized infantry—cannot be quickly enough withdrawn from relentless pursuit by the enemy's armoured machines. Even such a 'quiet front' as Tobruk becomes a hell's cauldron as the fighting machines twist and strain to free themselves.

Now it was never so in the old muscular wars. Armies could

¹ *F. S. R. III.*

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fight, break off, retire, and then pass through a long period of resuscitation before again matching strength with the enemy. There was no continuity of strain; battle was hardly more than an incident. In the World War, troops served at the front for a period, then moved into rest billets. Even at the front, battles were preceded and followed by long periods of relative inactivity.

In mechanized war the whole basis of operation is changed. War, campaign, battle—in the last two years we have seen these three words become almost synonymous. Why? Because of the continuity of action from first to last, a continuity necessitated by the overwhelming importance of movement in the new power equation. The partly vehicularized army is one which must continue, at whatever cost, to make and break ground for its armoured tactical weapons. Unless their movement can be freed, annihilation is thwarted, and the victory formula is destroyed. It is a condition which calls for extraordinary exertion by all forces. One might compare it to the situation of a motorcade in which the cars become bogged down. The human element then is under greater strain than if it were travelling afoot, and there is no relaxation of pressure until the column is again on solid ground.

I think it would be safe to say that the campaign in Russia was unlike any ever fought on earth in the continuity of its almost intolerable pressure upon the fighting forces. Both armies came many times to the brink of complete physical and moral exhaustion. It became a question of which would crack first, and on what side lay the handiest reserves.

Mechanized power cannot prepare against this dread climax except as it develops mobility in its protecting wing. It has gone much too fast. The demands of the machine and the limiting factor of human endurance have produced a dangerous unbalancing of modern military power. If equilibrium is to be restored the body of the army must be placed on wheels.¹

¹ The author points out that the tank is far from having completed its evolution, and that development along the lines of greater mobility and heavier fire power, rather than great size and heavier armour, will be the consequence of putting the infantry on wheels and giving it anti-tank guns of suitable size. In the realm of motorized power technical development by the American automobile industry has already outstripped the tactical requirements of the service. That is to say that the motor industry is now capable of producing, and is producing, multiple-drive vehicles which in cross-country capacity are comparable with the tank. They cannot bowl over trees, demolish houses or charge machine-gun

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nests, but in grade-climbing, and for traversing mud and sand, they are the next thing to a 'roadless' vehicle. Anyone who has seen these vehicles tested, or witnessed their operation in the field, cannot doubt that when the army sees fit to 'put the infantry on wheels' the motor industry will be able to supply vehicles which will enable the motorized combat divisions to provide close and efficient support for the armoured divisions. How soon such a decision will be made, there is no way of telling. War Department action seems to be based on a plan of maintaining a ratio of 1 to 1 between motorized and armoured divisions. On the 30th of April 1940 plans were announced which would give us six armoured and as many motorized divisions. One ventures an opinion that when modern military power is properly evaluated and balanced, there will be a ratio of 2 or 3 to 1 in favour of motorized divisions. It goes almost without saying that in the motorized divisions, the small unit, such as the platoon, should not consist of an arbitrary number of men, but of a logistical number; that is, it should represent a vehicle load. Units organized on that basis will be easier to move and organization will be maintained during movement. If for no other reason—and there are many others—modifications of organization are necessary in the motorized infantry division.

Another recent development with infinite possibilities is that of the small car variously called the 'blitz buggy', 'bantam', and sometimes, mistakenly, the 'jeep'. What the vehicle's future will be, it is hard to say. It may at first be slighted as the tank was slighted, and amount to nothing more than a replacement for the motor-cycle, which would be a great pity. In manœuvre groups, these cars would seem to be the proper instrument for the 'guerrilla swarm' operating in support of the armoured forces. For the cost of one Flying Fortress, 500 of them can be put in the field. Organize and arm them tactically, and train the crews on the principle of self-help, and with their accompanying heavy 'mother' trucks bringing up the relief crews and petrol, they could move farther in less time than any auxiliary striking force in the history of war.

On defence, just such a force could screen an army over 200 miles of front. On a raid into enemy country it should be capable of moving 800 miles in five days, independent of all supplies. For close-up reconnaissance, the small car yields only one advantage to the horse: It can't move along quite as quietly. But it can cover extremely rough country at much greater speed, and it doesn't grow tired. The cars are very small and unimpressive-looking. In this very appearance lies an important element of strength, for they have a low silhouette—which means very little target—and they can be cul-de-saced in no time and camouflaged in less. They can move along highways at sixty miles per hour, and across rough country at thirty to forty miles per hour.

7. *As to Independent Air Power*

If all men were virtuous . . . I should with great alacrity teach them all to fly. But what would be the security of the good, if the bad could at pleasure invade them from the sky? Against an army sailing through the clouds, neither walls, nor mountains, nor seas, could afford any security. A flight of northern savages might hover in the wind and light at once with irresistible violence upon the capital of a fruitful region that was rolling under them.

DR. JOHNSON

Any acknowledgement of air power's decisive importance in all military operation is now redundant. During the campaigns of the past two years it has spoken for itself. This is the Age of the Air. There is sure recognition of its essential quality in the fact that in our time it is not possible to inquire into the nature of land power or of sea power without appraising its most modern weapons in relation to the weapons, action, and strategy of the air.

In the eyes of the infantryman, aviation is no longer a thing apart. The ground soldier does not think of air power, for example, as he thinks of sea power. It affects him intimately, alters the routine of his daily life in war or in training for war, and at last may determine his fate. Because of the influence of air power his concepts of the tactics of his own branch of the service acquire new dimensions. It a sense he has taken wings. Since he may some day move by transport plane into the heart of enemy country and there be set down to engage in battle, he must strive more than ever for the general rather than the local view of every element of conflict. While seeking this broader approach to war, he must work for greater speed in all of his tactical movements as well as in communications. In the employment of airborne infantry as well as of parachute troops, it can be taken for granted that action will always follow immediately the landing, for the operation will be rehearsed well in advance over similar ground behind the defensive front. Celerity is therefore vital. A force so placed must explode upon the enemy with the speed and power of an air bomb. That calls for bolder, faster thinking than

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infantrymen have done in the past. It means that orders must be given in the fewest words. The soldier must develop a higher degree of initiative and the commander must learn to make decisions in one-tenth the former time.

Because of the aeroplane, protection has become an acutely personal principle with every category of soldier, even those in the rear-area supply services. The recruit soldier must learn the rudiments of the fine art of military camouflage even before he gets to the school of the rifle. If he does not do so, he may never live to reach the point where he can make use of his weapons. Among his first lessons at the Army Reception Centre is the manner of deployment at the approach of hostile aircraft. He moves thereafter in a world in which a new discipline, based upon respect for and protection against enemy aviation and collaborative effort with his own, is as much a part of the ritual as reveille and retreat. When at last he goes into battle the friendly aeroplane overhead becomes the emblem of his advance.

This close relationship between air and ground forces is the most distinctive characteristic of the present war. It might have come much sooner. In 1918 Brigadier-General William Mitchell of the United States Army Air Corps proposed an operation in which a full division of infantry, with arms and provisions, would be dropped behind the German lines by parachute. Because of a lack of practical experience with the parachute, the plan was postponed until the summer of 1919. So it rates a place with the massed tank attack which the British Army was planning for that year on the list of 'ifs' which might have changed the whole course of military history. There can be no doubt that a successful mass parachute operation in 1919 would have drawn the force of air and ground closer together, and attacks by air-borne infantry would not be regarded now as something phenomenal.

However, the military axiom that the special conditions of to-day become the general conditions of to-morrow applies with especial aptness to the future of parachute troops and the air-borne infantry. These services are the weather-vanes of the present war. Such attacks as the German parachute descent on the Belgian fort at Eben Emael and the lodgement along the Corinth Canal on the rear of the British withdrawing from Greece, as well as the decisive employment of the air-borne infantry in the

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capture of Crete, are startling because of their deviation from the usual methods of attack. But they are the commonplaces of to-morrow. In the not distant future, the mightiest of campaigns may turn on the action of large infantry forces dropped by air power behind the enemy's field armies and turned loose against his main bases to create the chaos which will vouchsafe victory to the oncoming tank and motorized infantry forces. A chief means of safeguarding a national defence against such attack, as noted elsewhere, is through the fullest motorization of the infantry.

But in his consideration of these prospects, let not the infantryman anticipate too much credit for himself. He will progress only in so far as the triumph of his own air power has made his progress possible. His new parachutist techniques and his inculcation of that high degree of independent thinking and spontaneous reaction to a situation, which are the talisman of successful operation by detached troops, will avail nothing unless he is travelling with a superior aviation. That will remain true even when the carrier aircraft of to-morrow convey twenty times the number of men and tenfold the weight in guns and rolling armour that they now transport. The decisive weapon for air-borne troops is now, and will ever be, command of the air. Lacking that, they cannot be sustained, and so had best not start. Air power, as a means of facilitating the strategic movement of land power, is nothing unless it is complemented by air power which has combat superiority in its own element.

Curiously enough, the more conclusively the interdependence of all arms is demonstrated by developments in the arena of war, the louder becomes the clamour for independence in air power. This is the favourite panacea. Senators, editors, and lesser fry acclaim it as a principle, without pausing to consider the application of the principle. During the heroic days of the 8th of August to the 31st of October 1940, independent British air power operating in magnificent detachment from all other forces came victorious through the Battle of Britain, compelled the air enemy to turn to night raiding in token of his defeat, and thereby wrote, as many thought, an unassailable brief for unequivocal control and command by airmen of their own tactical forces. But having 'saved the world' in the autumn, independent British air power could not defend Greece or hold Crete in the following

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spring when the task was the totally different one of forming a hitting combination with the ground forces and of organizing the ground defence of air bases according to the most elementary rules of security. What was remarkable about the Cretan attack was not the bombing preparation, nor the air transporting of land forces to the battlefield, but the carefully detailed system of supply and preparation of an elaborate signal code by which weapons, munitions, food, and reinforcements were dropped as the fighting progressed according to the precise needs of the troops on the ground. Here was a degree of collaboration between all forces which Britain could not understand, and towards which her independent air power had striven not at all after its liaison methods had miserably failed during the Battle of Flanders.¹ The second jolt was needed before Britain was prepared to listen to the warning of the critic, Captain Cyril Falls, regarding air force independence: 'Failure to learn the lesson of collaboration will result in defeat.'²

That may seem to be an unsympathetic and biased statement of aviation's attitude and quite typical of the protean ignorance of the foot soldier. Let us take, therefore, the case as it is presented by an airman. What was written by David Garnett in *War in the Air*, published by Chatto & Windus, in 1941 was not intended as an indictment or a defence of independent British air power, but as a commentary in praise of its history.

'The Royal Air Force has made no large-scale experiments with towing heavy gliders loaded with troops or equipment or with troop-carrying aircraft. The explanation, I believe, was not only that the Royal Air Force was an independent service and jealous of its independence and that the British Army was not air-minded. It was to some extent, because there is no long-standing tradition of a great army in Britain. . . . All that the Air Staff, with few exceptions, appear to have envisaged was that they should provide a few army co-operation aircraft for artillery spotters, and a few aircraft to carry generals about. And in return all they would expect of the army was to provide guards for airdromes so as to relieve airmen, who are skilled men, of

¹ On this point the reader is referred to Major Gribble's diary, published under the title, 'Blitzkrieg', by *The Saturday Evening Post*.

² *The London Illustrated News* of the 14th of June 1941.

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the drudgery of mounting guard. But I think the real explanation of this attitude is that senior officers of the Royal Air Force who had served in the war of 1914-18, were, at all costs, determined to avoid the mistakes in the use of air power which had resulted from its being at the disposal of soldiers who used it merely for local and tactical purposes. In the late summer of 1918, in face of opposition, a small independent air force had been created with Handley Page bombers capable of bombing Berlin. But before they could be used for that purpose the German armies collapsed, and the armistice was signed.'

Comment is hardly necessary. The easy assumption that the airman has superior knowledge of all military problems shines in everything that Mr. Garnett has written, as in most of the arguments for independent air power. But the 'local and tactical problems' which were beneath the contempt of the R.A.F. in 1918 were the basic ones of air-ground collaboration. As an explanation of why the Luftwaffe has beaten the R.A.F. in every operation when aviation and land forces have been engaged mutually, nothing needs to be added to Mr. Garnett's words, and nothing should be taken away.

In this age when it may be stated as a principle that nothing in attack or in defence should be attempted without air support, there may be some profit in turning back the pages, and re-examining the question of an independent aviation. During the post-World War period, when Brigadier-General William Mitchell was its chief advocate, the bombardment of the enemy's military bases and communications and his defence industries was considered the principal and decisive role of air power in war. It was held that the road to certain victory was to destroy the enemy's power to make war, and that a superior air power was the means. One does not oversimplify an admittedly complex issue in saying that the case for independent air power was built primarily on this proposition.

At a quick glance, the experience of the first World War seemed to sustain these general conclusions. During the great offensives on the Western Front, land power was not closely supported by its aviation. Troops were machine-gunned by the aeroplane. Their supply dumps and trench shelters were bombed. Rest billets were rarely safe. Infantrymen came to fear death by

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bomb, explosive bullet, or fléchette. The usefulness of its role in the strafing and demoralization of foot troops notwithstanding, all pursuit and close bombardment aviation in the World War operated primarily as a defensive force.¹ It engaged enemy aviation over the fighting front, disputed, and either won or lost command of the air. To the measure that it was able to accomplish this mission against its kind, it was able to move more freely thereafter against the enemy artillery, infantry, and communications, harass the operation of the land force and reduce its hitting power. In the history of the World War, however, there is no instance of the failure of an infantry attack through the breakdown of its air support, nor was there such integration of tactical function as would have warranted that judgement on the battle.

Aviation did not blaze a trail for its own infantry by moving in ahead of the assault to destroy enemy wire and resistance centres, nor was it a substitute for artillery in blasting a gap through the main defence zone and knocking out enemy batteries. Such things happened only experimentally and on a small scale. It is an old story that the advancing infantry was rarely aware that its aviation was engaging anywhere. The average front-line soldier came out of the World War with the impression that the striking force of the land and the striking force of the air could not be intimately related like the various corps of an army, and that there was no way of integrating them into one irresistible offensive weapon. As the further history of war was to show, many of the most experienced among their professional commanders were not less blind, and their blindness was usually in proportion to their professional experience.

For that they can be forgiven, because they had been born thirty years too soon. Military theory, as General Fuller has pointed out, usually plods one full generation behind the applied science of its age.² There is no more striking example of this truth than the failure of the general staffs in Allied countries to grasp the significance of mobile (armoured) power and project its influence on future war. In that failure the authorities prophesying about air power in these same countries shared to the

¹ The author speaks here in the sense of air power's relation to the other elements of battle rather than to other air power.

² *The Generalship of Ulysses S. Grant*, by J. F. C. Fuller, London.

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fullest extent and their sin was the greater because they were products of the machine age. While acknowledging the importance of the machine in future war, they discounted 2,500 years of military history, which sharply pointed the lesson that final victory in war is obtained by the seizure of ground. It was true of General Mitchell, and of his followers in the majority, that they were as limited in their grasp of the tactical usefulness of the aeroplane in modern war as they were expansive and over-zealous in defining its strategical horizons. They simply were not interested in exploring the subject of air-ground collaboration. Distant bombardment was the keynote. The decision in future war would be obtained through aviation acting as an attack force against the nerve centres of the enemy defence, paralysing his power to make war and so removing the need for large armies being sent against him.

Such was the distilled wisdom from the World War with which the leaders of military aviation within the democracies wrote their briefs for independent air power, and for which they are now credited with having had a clear perspective. They did not ask whether the mechanization of land power, started during the World War, would open up new vistas of usefulness for air power working as a team with surface forces. They did not explore the question of what kind of land power would be needed in order that air power could make optimum use of its fighting potential in furthering the reduction of enemy positions and the seizure of his ground. These questions they left to the enemy, and as events have proved, the enemy was not unappreciative. Distant bombardment had just begun to hit its stride as the World War closed. The last months saw almost daily circulation of the communiqués reading: 'Last night our avions bombed Cologne,' or some other city removed from the battle zone. The war ended with air power in the ascendant and civilians did not need to be told what would happen to them the next time. The moral effect of the Zeppelin raids upon London and the shelling of Paris by the big Krupp gun in the Saint Gobain wood had been tremendous. But these episodes were not more than a first taste of what was in store for civilians in future war. In the two decades between the two World Wars, the most spectacular theories of war and those which were chiefly responsible for awakening a belated public interest in the problems of national defence stressed

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the decisive character of distant bombardment. Wars were to be won by a 'bolt from the blue', giving ghastly hurt to the victim but affording a swift triumph to the victor.

The Italian, General Giulio Douhet, advanced the theory of the all-out air attack against enemy bases and concentration points during the first stages of mobilization, or in advance thereof, the aim being to destroy the enemy's military power before it could be set in motion. Douhet, a falsely maligned individual, was the apostle of celerity rather than of terror, a sort of Nathan Bedford Forrest of the air who argued the wisdom of 'getting there first'. The Italian invasion of Albania on the Good Friday of 1939 was more nearly according to the formula of this general than any operation in this war.

Douhet was too conservative for the times in which he lived and the circles in which he moved. The theory of distant bombardment which shook the earth and altered its history was that decision could be obtained by bombing civil populations into surrender. German propaganda turned this theme to profitable account. More than any other influence, fear of the total air assault with unlimited objectives set the stage for appeasement and prepared the way for the blackmail peace of Munich. After the beginning of World War II, London and Paris lived in dreadful anticipation of such a stroke, but the selected victim was Rotterdam, where 30,000 civilians were killed in thirty minutes of bombing by the Luftwaffe.

It seems fair enough to state that these concepts of a decisive use of bombardment aviation by unannounced attack upon either the armed forces or the civilians of an enemy country perforce had their origin in Axis countries. Their sheer savagery prevented their adoption by the democratic countries. The military advisers to the democratic governments dared not suggest that it would be better to beat the enemy to the punch. Germany and Italy thereby achieved a monopoly not only upon the blackmail power of military aviation—which served Italy well during the sanctions crisis over Ethiopia and Germany better during the manœuvring for Czechoslovakia—but a monopoly likewise upon the accompanying prospect of quick victory when the war came.

Now this is most important, for it says clearly that from the democratic view of total war, bombardment aviation could not

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be considered a means of swift and easy victory. Rather, it was but one of many factors in the national armament and economic potential which, working together, would in time prove irresistible. Democracy's chance for victory was in the long pull, which could only mean that all of the defensive resources of the warring nations would ultimately play their part in the struggle. Armies, navies, aviation, civil forces, finance, and industries—all would be tested, and infinite staying power in each of the categories would be necessary to the final success of the whole. Land forces would once again engage the armies of the enemy in the general battle. The decisive ground would be invaded or successfully defended. What resulted from the elemental clash of men and weapons on the battlefield seemed as likely to have decisive effect as the damage to the enemy's war industries by the attack of the bomber.

This being the prospect, military aviation within the democracies had not less reason than the enemy to seek the fullest collaboration with all other instruments of the national defence, and carefully to evaluate the tactical lessons from the immediate past. The success of German and Italian attack (close bombardment) aviation during the Spanish Rebellion, in which air support for General Franco's advancing infantry was much more closely knit than ever during the World War, constituted a warning that the synchronizing of air power and armoured land power in the offensive might be the next step.

But it was the German aviation which saw fit technically to improve and tactically to extend the great forces which had been only partially exploited during the World War, bringing the 1918 battle up to date by providing its elements with greater speed and more protection. The attack in the World War had found no way to accelerate the fatally slow pace of the infantry; by the time the gap was reached the enemy had closed around it. So in the new attack the striking force was put on wheels and tracks and shielded behind armour. Its artillery moved on self-propelled mounts with guns pointed towards the enemy. Even anticipating the rolling guns, however, additional striking power was needed of a kind which could demolish the enemy's armament without itself coming to a stop and so retarding the general movement. In this role, attack aviation went to bat for the heavy artillery, and the Stuka bomber became the complementary

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weapon in a new form of operation. 'The most deadly artillery', Captain Falls has written, 'since the Mongol cavalry of Genghis Khan won their battles with artillery as mobile as themselves; the bows and arrows which they carried and used from the backs of their horses.'¹

The answer when stated appears so perfectly simple that there is no other explanation of why for more than twenty years it was overlooked by most of the distinguished professions. It has been remarked with wonder by such an authority as Alexander P. de Seversky that 'the present magnificent German utilization of air power was conceived only five years ago'.² Estimates of this kind, however, discount the years of preparation and of striving for unification of thought, command, and action which paved the way towards the desired goal. The successful marriage of air power and land power must have resulted in the first place from a perfect meeting of minds. No one man authored the essentials of blitzkrieg operation. It was a process which called for the most expert direction both from above and from below, with the air forces being brought into complete understanding of the problems of the land offensive, and infantrymen coming to grasp both the limitations and full potential of the air weapon. The amount of team-play needed to carry through such an operation was not less than that required to imagine it in the first place and to supply the technical details. Making the achievement more remarkable was the fact that Germany's military aviation had been destroyed by the Treaty of Versailles. Its operation in the days of the Republic was limited and clandestine. Yet regardless, it was able to persevere in ways undreamed, or at least not attempted, by its future foes and to 'assume progress not visible to the naked eye'. Imaginative planning is most likely to occur when men have only audacity to suffice for means. A machineless air force, however, is an instrument without dignity and prestige, and exists only through the sufferance of the other arms. With the Reichswehr not only a living reality but the most efficient military organism in Europe, it was inevitable that as the embryonic Luftwaffe began to prepare for the next war, it should be subordinated to the land command in operations.

¹ *The London Illustrated News*, the 14th of June 1941.

² 'Hard Facts on Air Power', in *The American Mercury*, August 1940.

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initiated during the period of manœuvre, this arrangement was subsequently confirmed by continuing success in operation against the enemy. In its employment with land forces during the general offensive, German air power moves and acts according to the plan of the surface striking force, and the commander of the latter has full authority over the total force, designates the missions of air power and decides at what point it shall break off the battle.

Now this is 'independence' as it exists in the Luftwaffe. In a word, it is the independence of unification: the independence of morale, *esprit*, and the creative faculty. It means freedom from a restrictive doctrine, and liberty to explore and to examine each new role objectively and prepare for it fully. But it does not mean the self-determination of military function or discretionary powers over its missions in collaborative action with other forces. In the outright air offensive, as for example in the Battle of Britain, where its problems are unrelated to army or navy, it has full powers. With this kind of independence, and the influence upon all other arms which is the natural derivative of mutual contact and confidence, the German air force has done more to alter the face of war and to make obsolescent the most modern treatises on tactics and strategy than any other group of men on earth.

Only an enemy of the national interest would deny air force this kind of independence. Only the most dogma-ridden militarist would insist that in its strategic and technical planning for the kind of war that will be fought to-morrow, air power should be compelled to submit to the prejudices and limitations of a staff which has lived most of its life with both feet either on the ground or in stirrups. But anyone who has looked twice at the mechanized battle knows that it has no time for argument about who is master and who servant. It is a team problem and undivided authority over it must be held by the ground commander for no other can have the final responsibility. The machines of the air and of the ground are complementary forces. One cannot operate safely for very long without the other. The aeroplane by finding the enemy tanks enables its own armoured force to attack, and so protects its own base. Without the tank the rear of the air force is largely uncovered and without the aeroplane the front of the tank is largely blind.

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While this relationship endures, the air corps is just one more category of soldier.¹

¹ Colonel Kinzie B. Edmunds epitomized the case when he wrote in the June 1941 *Command and General Staff School Military Review* these words: 'There is much to be said in favour of an air organization separate from the Army and Navy. The contention of decisions delayed, production held up, by demands for changes in design from Army and Navy, and differences between the two, is probably well founded. Great Britain has a separate air force, and Germany. Of these, Germany at least secures excellent co-operation between air and ground. However, if the separation is urged with the object of enabling the Air Corps to operate on lines divergent from those followed by other components of our armed forces, opposition to the idea will continue.'

8. *Machines and Men*

War means fighting. The business of the soldier is to fight. Armies are not called out to dig trenches, to throw up breastworks, to live in camps, but to find the enemy and strike him; to invade his country, and do him all possible damage in the shortest possible time. This will involve great destruction of life and property while it lasts; but such a war will of necessity be of brief continuance, and so would be an economy of life and property in the end. To move swiftly, strike vigorously, and secure all the fruits of victory is the secret of successful war.

GENERAL THOMAS J. (Stonewall) JACKSON

The machine', wrote Charles de Gaulle when a young and unknown captain, 'controls our destiny.'¹ One hears it commonly said to-day that this is a machine war, that numbers of men no longer count and that the decision will be determined by the competition in the production of death-dealing machines. The idea is neither new nor wholly true, though it is because men think they have discovered a new truth that they repeat it so glibly, and the impression grows that the machine has eliminated the need for mass. To the contrary, because of the machine, the theory of modern warfare must remain on the basis of a national defence regardless of whether a country attacks in order to overcome a threat or defends against an offensive of the opponent. There are not fewer men in American industry to-day because of the machine; in the last generation the number of employed has doubled as the number of machines has grown. Even so with the army. The machine gives an enemy greater protection (since movement is a form of protection) and better facility for entry into the territory which he seeks to invade. To break down that protection and to cover the more numerous channels of entry which have been produced to serve the machine larger numbers of men are needed by the defender. There is no escape from this proposition; it builds up to a point where victory in war is more elusive than ever before. Instead of a test of military skills, war becomes a test of a whole society's powers of endurance. At first

¹ *The Army of the Future*, by General Charles de Gaulle.

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glance the machine may appear to have restored the art of generalship and reduced destruction as the end of battle, but fundamentally it has intensified the gruelling character of the contest and solved none of the problems for which it was created. Machines beget other machines. The result may be mutual destruction and ultimate command of the battle by the static forces, as has happened time and again in the Russian campaign. When that comes to pass, what chance has the army which has regarded the machine as the substitute for, not the complement to, mass? To advance such ideas is to invite Fuller's caustic comment that 'to think like a wild beast is easier than to think like a philosopher' but those words were written before events proved once again that philosophers do not command the actions of warring nations.

There is nothing new about the principle. It is as old as history, or as old, for that matter, as the identity of the machine with the offensive idea in war. As far back as one wishes to search, it will be found that the machine has lightened the work of armies and increased their striking power. The Iberian tribes of 230 B.C. fought the armies of Carthage by filling ox carts with inflammable material and stampeding them into the enemy camp. Alexander the Great met something which must have been quite like a charge by middleweight tanks when Porus, the Indian potentate, sent 200 war elephants against his lines in the battle of the Hydaspes. In time, elephant tactics and weapons begot anti-elephant weapons and principles. The Romans stopped the beasts with anti-elephant guns (ballistas) and anti-elephant traps or pits, as well as by means of an elastic infantry defence which permitted the elephants to infiltrate through to the ground which was held by special anti-elephant reserves.¹

We get here a picture of ancient war which so closely parallels the battle arrangements of to-day in certain of its details that there is a natural temptation to believe that the tank will go the way of the war elephant, and the modern General Staff will be able to solve its problems along the same simple lines as the commanders of antiquity. Any such conclusion is the result of looking at but one corner of a very large canvas.

¹ Liddell Hart tells a story of a Nottingham plumber who gave the British War Office a design for a tank in 1911. It was pulled from its pigeon-hole after the World War and on it was the scribbled notation: 'The man's mad.'

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Power and movement are the mainsprings of civilization. In the economic growth of movement over the earth must be sought the direction of the physical and psychological progress of its peoples. Peace has always begotten war. The only legitimate object of war is to establish a more perfect peace. These things being so, the chief concern of society in war as in peace is the search for the new equation of power and movement. All progress depends upon it—even the progress towards a more lasting peace. Liberty and weakness have never been compatible. Where men enjoy the dignity of the free life to-day they do so only because somewhere along the line other men have employed military power on behalf of these freedoms as Washington employed it along the Delaware or Lincoln along the Potomac. The widespread distrust of military power among free men is in this sense a renunciation of their birthright, since whatever liberties they now possess have come to them by the wise use of it. If freedom is to be preserved, it will be done by the same means. If a more perfect peace is to be established, it will be done only through a more perfect form of military control over peoples passionate for power and its use towards their own aggrandizement.

In its broadest sense the effect of the machine upon a national defence is to increase greatly the measure in which the power and movement of military forces are dependent upon the power and movement of the society which supports them. The rule works both ways. That which serves a defence may also prove of decisive use to an enemy invader. As civilization thrives and develops around the machine, it becomes proportionately vulnerable to attack by the machine. Examine our own situation with respect to the development of a modern highway system in Mexico and other republics to the south of us. These roads, built primarily to attract the tourist or for the use of industry, open their respective countries to attack by a mechanized army. The republics have been made more vulnerable but their prospects for a modern defence have not been increased. Their military organization is still in keeping with a handicraft age. Air bases suitable for military use are to be found next their cities and even in such waste areas as the Yucatan and Chiapas jungles. But means for defending these air bases they do not have. Their coasts, furnished with excellent harbours and river

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mouths where submarines might base, are relatively undefended. In the old military age, when all armies moved by muscle power and the average road south of the Rio Grande was fit only for an ox cart, the conquest of any of these republics required months of laborious operation. The motor age has ended not only their isolation but their security.

Perhaps the most striking example of the effect of the machine upon a national defence during the course of the present war was provided by the Red Army when it blew up the Dnieper Dam. The dam had become the hub of an axial highway net providing communications between the dam and the industrial cities which it served. This net facilitated military advance towards the dam and upon the cities. As the Germans drew up to the Dnieper, the Russian command was confronted with the stark fact that the presence of the dam was one of the chief obstacles to the defence of the east bank of the river. It lay some miles below Dnepropetrovsk and the terrain westward of that city is distinctly unadaptable for defence. To cover both dam and city, the whole of Marshal Budenny's army would have been needed on the west bank of the Dnieper, and the area of the lower river would have been made correspondingly vulnerable with no compensating assurance that the defence of the Dnieper bend would have had any other long-range effect than to put Budenny's force in a cul-de-sac. The consequent decision to blow up the dam was as correct as it was bold, though such was the German advantage in mobility that it could not save the position. Of the German entry into the Eastern Ukraine within less than one month after the dam's destruction one might comment with two of the oldest truths of war that the power to move is the power to achieve a decisive concentration and the power to advantage your enemy in reconnaissance is the power to smash him with surprise. The German Army obtained its swift successes largely by manœuvre rather than by shock action.

Without oversimplifying the case, it might be said that down through the ages the changing forms of military power have largely reflected the evolutionary changes in transportation. The easier it is made for men to move from one point to another in time of peace, the more certain it becomes that the trend of military organization will be towards large bodies of men. The introduction of steam power increased the commerce of the

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oceans and also the strength of world navies designed for its protection. On land the facilities which speed the flow of goods in greater volume than ever before enable the more rapid movement of armies in greater masses than ever before. But because such things as the mails, perishable goods, or Congressional junkets get about faster in time of peace, it does not follow that in time of war all movement will be as the lightning, or that all hitting power can be impacted into the most mobile forces. To expect such things is to believe that generals are capable of miracles beyond the powers of science and that armies are more clever than the societies from which they spring. There are no perfect solutions. At best, there is only a continuing search for them and in this eternal quest the objectives in our own age are strangely like those of the remote past. Only through a change in the spiritual fibre of twentieth-century civilization could there be wrought a fundamental change in the nature of military power. If the great nations could eschew immediate self-interest as the basis for their relations one with the other, and start anew from some such ground as the Eight Points enunciated by Mr. Roosevelt and Mr. Churchill, then mechanization and air power together could provide a relatively inexpensive foundation for a permanent and effective international police power. Lacking any such utopian arrangement, the machine must always beget mass, and the end of it is greater suffering and increased slaughter.

We are hardly in position to deny this truth when we see armies in any age returning like a wheel to the old starting-points. The Romans built roads for conquest. So did modern Germany. Its Autobahn was a military highway. As a protective measure, the Romans strung their sentry posts from point to point as the roads touched a skyline. The Germans covered their Autobahn at strategic intervals with dummy anti-aircraft guns. The history of warfare is filled with such curious parallels. In a military treatise written 2,500 years ago the Chi State general, Sun Tzu Wu,¹ said what might very well have been entered without change in List's general orders to the German armies which in the spring of 1941 attacked Yugoslavia and Greece: 'Rapidity is the essence of war. Take advantage of the enemy's unreadiness and

¹ For more information on the amazing career of Sun Tzu see *Roots of Strategy*, by Lieutenant Colonel Thomas R. Phillips, Harrisburg, 1940.

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make your way by unexpected routes to attack the unguarded places.'

In the centuries since Sun Tzu, the principal pre-occupation of all military leadership has been the search for the new equation of power and movement. Prior to the coming of the railway, armies remained relatively small because supply and evacuation depended on transport by road, and the road itself was an artery sufficient only for the passage of one line of ox carts. When steam power came to the assistance of the armies in the nineteenth century, their expansion was so great that to control their movements the strategy and tactics of warfare, which are limited by the supply problem, became extremely methodical. There was a resultant rigidity in military organization. Generals tended to think more and more in the same pattern. Manœuvres took a similar form in all armies.¹

Since armies could not travel by railway train into enemy country,² the equating of power and movement was expressed chiefly in the strategy of attack upon the enemy's chief means of bringing his armies forward and keeping them mobile. Operations began to centre in the railway. The reign of steam began by greatly increasing the movements of peace. It ended by enabling the rapid deployment of such vast masses of troops during war that all movement, in one degree or another, was inhibited. Armies could be moved into the battle zone over rails, but had to break away to fight. In the World War, streams of armed men debouched from railway cars, moved forward a brief pace, then settled. No way could be found to shake the grip of an inadequate highway system upon their supply. No route could be opened through the enemy's curtain of artillery and machine-gun fire so as to attack the sources of his military power. The amount of material the railways could transport was for ever below the enormous appetite for shell and equipment of the armies which

¹ General Fuller develops this theme in *F. S. R. III*.

² There have been many notable exceptions to this rule—for example, War Correspondent Winston Churchill's wild ride aboard an armoured train into enemy country during the Boer War which ended in disaster at the Blue Krantz River. Railway trains were sometimes used on scouting missions in the American Civil War. The Mexican revolutionary, Pancho Villa, made daring tactical use of the railway in his Chihuahua campaign, moving his army through the enemy position in box cars. In the World War, after Leon Trotsky had broken off the peace negotiations at Brest Litovsk, General Max Hoffman promptly entrained his infantry and invaded Russia under steam power without bothering to deploy his forces.

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they had brought forward. The bitterest quarrels of the Allied commanders attended the discussion of railway problems.¹ Generalship degenerated into quartermastership. Paralysis at the front produced a condition of atrophy at the rear. Movement was lacking and therefore power failed. The deadlock was dissolved in the end not because the generals found the new equation but because in the absence thereof the armies struggled until at last the weaker antagonist succumbed to exhaustion. Changes of method came about through the sheer pressure of events after costly trial and error.

But a solution for the future was indicated when the tanks began to move across the field of fire and 'from the armies which used these machines little streamlets of men trickled forward out of the great stagnant human pools'.² At the same time the aeroplane started to manœuvre against the rear areas of war. So the sceptre was passed from steam to petrol power though the conditions requisite to a successful reign were lacking, and did not mature until the 1919-39 Golden Age of the Motor Highway. The great tank masses which the British Army had prepared to lead its victory campaign in 1919 (had the war lasted) might have failed in any case because of the churned-up state of the combat zone, the bad road conditions of the rear areas, and the lack of an infantry vehicularized for cross-country movement.³

Once again the progress of war was to become the after-effect of a new equating of power and movement in the arrangements of a peaceful society. During the twenty years of peace military technicians toiled over the aeroplane bombsight, improved the tank, and laboured to perfect semi-automatic fire through the design of the M-1 (Garand) rifle. But their handiwork had less to do with the introduction of the new age in warfare than the propaganda of the Unknown Civilian who, from an A.A.A. desk in Detroit, broadcast the gospel that to serve the prosperous motor tourist good roads had to extend everywhere. He had a collaborator—the lobbyist for the truck and trucking companies who worked not so much for ubiquity as for breadth and

¹ The railway problem reached its crisis in 1917 during the preparation of the Nivelle offensive. The conditions attending the crisis are described in Brigadier-General E. L. Spears' *Prelude to Victory*.

² General J. F. C. Fuller's *Pegasus*, New York, 1926.

³ The question is debatable, though General Fuller says categorically that without the tank the Allies would have had no victory in 1918.

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heavy duty qualities in the main stems of highway travel whereby one great city was connected with another. The prospect of wealth by work is the lodestone of movement in peace and the chief stimulant to the growth of all communications; the facilities thereby established are not less serviceable when the aim is 'wealth by robbery.

Turning to a comparison of the serviceability of the railway and the modern turnpike for the large-scale movements of armies, one is impressed foremostly with the relative indestructibility of the latter. In a few days of operation, William Tecumseh Sherman was able to destroy one hundred miles of railway with a few squadrons of cavalry, though they groaned under the duty. To work similar destruction upon such a structure as the modern Pennsylvania Turnpike is not within the power of the largest army in the exigencies of a retreat. 'We had come about a hundred kilometres from Aachen,' writes William L. Shirer of the 1940 invasion of Belgium.¹ 'In all that distance I had not seen one bomb crater in the road. While the German Stukas put the Belgian railroad out of business, they were careful not to blow up the roads or their bridges.' The retreating Belgians did not have time to blow them up. The second point is that whereas the necessity for defending a rail line is not offset by any tactical advantage, the highway itself and the belt of favourable terrain which usually flanks it is the salient of attack for motorized forces and the means of entry into the enemy country. 'This war had been fought along the roads—by two armies operating on wheels,' Shirer notes further along. Conditions have so altered within a generation that the railway itself may now have tactical uses, though only as a substitute highway for the self-movement of tracked vehicles as when the German tanks rode the wide-gauge Russian roadbed during the advance upon Minsk.

As it may be said with some truth that the machine made the highway and the highway made the war, it may be added with equal truth that the machine has produced a new kind of vulnerability in the nation which is fitted with a modern highway net but lacks a motorized defence proportionate to the spread of its road system. This is as true of the highly industrialized nation as of states having a low military potential such as the Latin American republics. The effect is to provide easy access for the

¹ *Berlin Diary*, by William L. Shirer.

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conqueror to that nation's sources of power.¹ If it is possible to-day for one man to conquer the world, it is because the machine has mis-shaped our destiny by smoothing the road for the march of military power. Our annoying American habit of rejecting any such unhappy view of the future in favour of the comforting cliché that all conquerors meet their end by over-reaching is but one more manifestation of our tendency to dismiss with contempt all military questions or to urge their solution in terms wholly inappropriate to the problem. Such attitudes as these do not make for survival in a world filled with dark powers and questionable values. Mr. Hoover, expressing in his radio address in late September the confident thought that in some way the military power of Hitlerism would be destroyed before it could challenge the United States, and Mr. Lippmann, writing in his syndicated column at about the same time that we should reduce the size of the United States Army, may both have represented a large body of American opinion, but neither view was consistent with the progress of military events in the Russian theatre, or the then state of German military power. 'Our great peril comes from our lack of understanding,' General Charles P. Summerall, the former Chief of Staff of the United States Army, said to me in June. 'Our people, in the majority, realize the advanced state of the emergency, but they cannot raise their sights. They are unwilling to think in terms of submarines by the thousand, tanks by the tens of thousands, and airplanes by the hundreds of thousands. In a time of grave peril, the greatest of all dangers comes from the search for easy solutions.'

It has been said before, but bears repeating, that great wealth and industrial vigour do not of themselves assure the survival of any nation, and indeed, if not utilized in time, actually make for vulnerability. Given a head-start on a richer nation, the poorer has a chance to win. The machine is both hitting power and target. Industrialism lowers a nation's defensive position primarily by making it more vulnerable to mobile military power. The nerve centres of a national resistance, as of industrial production, are concentrated to a point where a nation

¹ Another of the broad consequences of the motorization of armies is that the industrialized cities have become the chief recruiting ground of the armed forces whereas formerly the sturdiest and most reliable soldiers were drawn from the agricultural populations.

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might be brought down by one squarely landed blow upon its productive solar plexus. Striking at the activities that sustain life and produce the machines essential for decisive warfare is a far more effective attack than the destruction of a few thousand lives in battle, because if persistently carried out it will result in demoralization of the public will and dislocation of the military plan. The extreme centralization of industry enables concentrated hitting at the civil will through air attack, and the existence of a radial highway system serving industry facilitates the movement of enemy armed forces towards the vital sources of defensive power. The Fifth Column danger has been stressed sufficiently so that it becomes almost unnecessary to add that the attack need not await the arrival of the uniformed forces of the enemy. Men no longer draw water from the village pump. The city of New York could be depopulated within a few days by the dynamiting of a water structure in the distant Catskills. One-half ton of explosives could demolish an intake along the Detroit River and thereby jam the wheels of an important section of American war industry. The tremendous expanse of our nation gives its individuals a feeling of size, and therefore of strength, but its vital centres are few and extremely exposed. It is a curious truth, though not widely understood, that while only industrialized countries are able to wage organized warfare today, the more industrialized a country becomes, the more vulnerable it is to the present forms of attack.¹ The defenders of the

¹ It is a familiar argument that the very 'bigness' of the United States makes invasion impossible. What is not perceived is that the more mobility increases, the less becomes the value of spaciousness in a defence if the defender relies primarily on numbers of men rather than perfection of weapons and in methods of warfare. The advantage of mechanization is that it reduces space by economizing time. But an advantage in mobility alone is not enough for the defender, else our 25,000,000 American automobiles would alone clinch the victory. Superior strategic mobility implies arrival in time at the scene by decisive forces. It is the military equivalent of the speed of the fire engine which arrives before the fire takes hold. So in mechanized warfare, when decision comes of the concentration and rapid movement of relatively small forces, spaciousness in the area to be defended necessitates that the defender have superiority both in the number of decisive weapons and in general mobility. One might very well believe that an army of 1,500,000 men with five mechanized divisions would be sufficient to guard the island of Britain against any invasion because of the size of the area. In such time as the invader would require to seize and make secure his main base of operations, pioneers could be brought up by the defender to organize the outer ground against him while from points relatively near the scene the decisive armoured and anti-armoured forces would move into the battle zone. Scattered over the United States, this same army would not have strategic domination of the problem. Its mobility would not be less; what occurs is that it diminishes in power to concentrate against the objective.

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American frontier were given a certain kind of immunity by the isolation of the mill wheel. This source of bread and sustenance has been supplanted by a nation-wide system of energization, production, and distribution which might be short-circuited in a hundred ungarded places to the lowering of the public morale which is the foundation of the national defence.

To consider yet another example of how recent technological advance has opened whole new vistas for attack and defence in war time, there is the influence of radio which enables mankind to converse around the world 'in the clear'. A voice speaking from Batavia dramatizes the fact that we have a unity of interest with military forces in that quarter of the world even though the listener might be hard pressed to name one island in the Dutch East Indies. The housewife on an isolated ranch in Idaho may now twist a dial, and if she is persistent in her search, in between quiz programmes she is likely to hear a voice saying: 'This is London calling.' Americans not only take these magic phenomena for granted, but have come to lean upon them, and to seek assurance from them. The most winning commentator of our time is he who takes the line that everything's going to be all right, though beyond this search for a soporific is a very real dependence upon information. Frederick the Great's remark, that the foundation of an army is its belly,¹ applies equally to civilian resistance in war time, but second in importance only to food as a prop to public morale is the flow of news. One of the prime characteristics of this trend is the broadening of public understanding of the nature of war at the expense of close study of its purely military aspects. Economics has eclipsed logistics. The change is perhaps consistent with the evolution of modern society which predetermines the nature of its warfare. The military literature of Frederick's day contains no term comparable to the ugly and overworked 'bottleneck'. Nor was much heard about any 'war of nerves' prior to the present war. These are concepts born of total war in which the inter-relationships of events in the military, political, diplomatic, and moral spheres are more generally recognized. The World War had almost nothing to do with the development of the psychological offensive. In fact, the siege conditions of that struggle prohibited it. That

¹ Credited to Napoleon, but Frederick said it earlier, and perhaps Alexander said it first.

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it is now a universally recognized part of the business of war is not due so much to the military philosophers who considered this problem in the post-war years as to the influence of the tank and the bombing plane which opened up the rear areas and brought civil populations into the area of conflict. New weapons beget new methods of warfare. Weapons which may strike anywhere necessitate an active interest in military affairs throughout the whole of society.

Unfortunately, however, more publicity has been directed to persuade the average citizen of the connection between national security and the presence of vitamins A, B, and C in his daily diet¹ than to enlist his support for a military policy that will be secure from abuse by party politicians as well as beyond censorship by reactionary generals and admirals who are unable to grasp future possibilities however full their knowledge of present actualities may be. He may be easy to convince that by swallowing a certain pill he will do a service both to his country and himself, though the suggestion is quite apt to leave him cold that he use his influence to help unfetter our defensive establishments so that when competent, far-visioned commanders are placed in charge, they will have greater discretionary powers over the building of the machine for whose success they are held responsible in war. The gulf between what a Chief of Staff of the United States Army might like to do towards modernizing our service and what his powers permit him to do is vast indeed, as many of the occupants of that high position have discovered somewhere along in their tenure. The dead hand of tradition is not more of a deterrent to action in the emergency than is the division of authority as provided by our law.

The Britain which awaited Napoleonic invasion got most of its military information from extracts from Continental sheets, as British journalism was then just taking its first infant steps.² To-day the British people insist that they have a 'right' to full information about ship sinkings and the progress of the Battle of the Atlantic. There was a public outcry because the Admiralty preserved a strategic silence immediately following the

¹ Witness the change in American advertising which dwelt on other things than war in 1917-18 but has made national defence its theme song throughout the present emergency.

² *Napoleon and the Invasion of England*, by H. F. B. Wheeler and A. M. Broadley.

sinking of the battle-cruiser *Hood* while organizing the pursuit of the *Bismarck*. In the United States it is the custom of radio commentators on the war to report headline events on the labour and industrial fronts along with developments on the battle fronts. In fact, the impact of news resulting from the development of radio has increased public sensitivity to all kinds of information in war time to a point which promotes a new danger.

One cannot dismiss the subject with the simple statement that where there is lightning movement there is need for lightning intelligence. Within one day of Josef Stalin's appearance on radio for the first time in five years to advise his countrymen that the Red Army had been badly hit at the frontiers—a message which is supposed to have steeled Russian resistance—the British Government was bitterly assailed by the press because announcement of a British victory in Palmyra, Syria, had been heard from Radio Vichy an hour or so before the Information Service released the news to the B.B.C.¹ The very speed and completeness of modern communications is a war weapon which cuts both ways when unwisely handled, and its potential in the contest for world power is as yet only vaguely understood.

It is safe to say that a monopoly or near monopoly upon the propaganda and news distributing facility of radio in the Eastern Hemisphere by the aggressor powers would have consequences as far-reaching as a military victory of the first magnitude. Much attention has been directed to the peril of our own defensive position if British sea power should fall into German hands; none at all to the question of how rapidly our own determination to defend the Western Hemisphere against every aggressor might crumble if from the radio stations of Britain, Turkey, Russia, and Switzerland we nightly were to hear the opportunist and renegade nationals of a new group of German captive states expatiate, for our benefit, upon the blessings of a Hitler-controlled universe, or singing in the same key with the America First Committee. That would be 'V' day for the club-footed Dr. Goebbels. Among the chief supports of our American self-confidence is that we do maintain a reasonably satisfactory and regular intercourse with the other free capitals of the world. 'Go ahead, Ankara,' is a nightly tonic. Winston Churchill's voice denoun-

¹ Dissatisfaction with the Information Service prompted a near-crisis in the British Cabinet in July 1941.

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cing That Bad Man is a reminder that a St. George stands between us and the dragon. If this nation were to experience once the meaning of complete and final isolation from all other peoples because these peoples had been compelled to surrender their freedom of speech at gun-point, those who in this country have sown the wind of a phantasmal and ocean-guarded isolationism would reap the whirlwind of nation-wide demoralization. Every new weapon has ended someone's isolation. Radio, the most paradoxical of the weapons, makes isolation itself a means of attack upon the isolationist's security.

In countless other respects, the methods of the new warfare have conquered space. 'To the practical men in the aviation industry engaged in designing planes for planned tactical purposes', writes Major Alexander P. de Seversky, 'military aircraft with a range of 25,000 miles seem wholly realistic in the predictable future—in five years at the outside.'¹ Such an operation radius, or even half that, would mean that no part of any nation would be secure against direct attack from any part of the globe. In the light of what Seversky calls 'the predictable future' it is not reassuring to note how industrial concentration alters many of the proportions of strategy's main problem of equating mobile offensive power and distributing static protection. The very spread of the target makes for easy finding and difficult defence. American industry, heavily concentrated around centralized sources of power, is an ideal target for the air offensive. The Germans saw, far sooner than we or the British, that a principal means of protection against air attack was diffusion of the target by the decentralizing of industry as well as by the elaborate camouflaging or underground placement of vital works. Had Germany's war industry still been concentrated in the Rhine and Ruhr areas,² what might have been accomplished by R.A.F. bombing operations during the summer of 1941, when German air power was primarily concerned with the Russian campaign, can be left to the imagination. British air power's violent and prolonged offensive against the southern industrial cities could have been decisive. In Britain the decentralization of industry where practicable became a policy of the Imperial defence after the war began, but there was then no chance to remedy the

¹ *The American Mercury*, May 1941.

² *Blitzkrieg*, by S. L. A. Marshall, New York, p. 40.

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general situation. In the Second Battle of Britain, which began on the 1st of April and ended on the 30th of April 1941, the chief objects of attack were the island's industrial cities and the result of the Luftwaffe's campaign was such general damage to production that the confidential reports shook Washington and accounted in no small part for the Navy Department's extreme agitation over Britain's supply situation.

In the United States decentralization is rarely mentioned as a defence principle. Periodically the press becomes interested in



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the project for factory concealment but quite naturally is as zealous as the chamber of commerce for any new war industry that can be brought to its midst. During the emergency the production of war goods has tended towards ever greater concentration. In this as in some other respects we have closed our eyes to the primary lessons of the war, or have shaken them off if we find the inferences a little too disagreeable.

Compare what we are doing with what goes on in Germany. According to *Time* (the 4th of August 1941), the Germans are now constructing dummy towns and cities and elaborately faked harbour works to mislead air attack. According to *Newsweek* (same date) we have made one city, Detroit, the hub of our entire defence industry¹ and a successful air assault against a really

¹ Detroit is the fourth ranking area in the volume of its defence contracts but has expanded the most rapidly of any.

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small section of the community could knock out plants manufacturing tanks, mosquito boats, aeroplane engines, anti-aircraft cannon, machine-guns, shells, naval-gun housings, and multiple-drive transport units. The few among my Detroit neighbours who are beginning to think of digging an air-raid shelter in the backyard may be somewhat more realistic than our industrial planning for war, though they look at it as a matter of personal jeopardy rather than a situation which may endanger the whole country.

As for the country, possibly the extension of our line of outposts to such points as Iceland and British Guiana has given it the comfortable feeling that our problem of protection is lodged finally in these distant ramparts. There is general recognition of the power of aviation and the need for producing fighting aircraft in great volume, but none whatever of the equal need for taking the most basic safety-first measures against air invasion. The crushing offensive values of the tank and the armoured car are commonly acknowledged; less so, the fact that their power derives from a set of conditions which makes highway transportation management a more complex problem in war than in peace and more than ever a field for exhaustive military study.¹ Even the policies of civilian defence, though now entrusted to civilians for political reasons, must in war be largely influenced by the military,² since attack will develop and defence mature, not according to the size of the local fire department, but in proportion to the community's vital relationship to the defence of the country as a whole.³

Military power is the economic resources of a nation converted into shape to be used for military purposes. One of the main elements in military power is protection. To-day, only a nation which has a strong industry capable of producing aeroplanes, tanks, and motor vehicles by the thousands and fully mobilized when war comes, is capable of sustaining a modern field army. Equally, the protection of this industry, which in war becomes a chief preoccupation of the military, is best had by a

¹ This subject was well presented in an article by Captain Warren S. Everett in the *Infantry Journal*, November–December 1940.

² A plan for civilian defence prepared by the War Department was pigeon-holed in 1941 just prior to the La Guardia appointment.

³ President Roosevelt's comment upon vetoing the defence highway bill on the 5th of August 1941 '... national defence cannot be reasonably related to the population of states or other factors of ordinary apportionment.'

realistic facing of the problem of protection during the period of industrial mobilization. Where Napoleon could say that tactics change every ten years, we are living in an age where they must be modified from season to season and wherein one new weapon—for example, an aeroplane capable of accurate tank-stopping cannon fire—might wholly transform operation. It has always held good that an army to prosper must keep pace with the advance of the civil sciences. In total war, this is not enough. Since the whole fabric of society is under attack, there is the greatest necessity for a meeting of minds towards the solving of the common problem. Civilians must direct their gaze to the military future. Leadership, civil and military, which cannot plan beyond what is to be seen with the eyes and felt with the hands to-day is not qualified to formulate a modern defence system.

Hardly more than thirty years ago, when the first flying meet was held at Rheims, France, a British military observer, one General Grierson, turned to his companion and said: 'I say, Stone, you can't really believe there is anything in this thing!'¹ To-day, however, even a less imaginative soldier than Grierson would probably agree that when war comes to the United States, the air attack upon our industries is apt to be powerful and continuous. The easier the targets are to find, the more heavily will they be hit, and the greater will be the resultant damage to our military position for fighting the war, as well as to the economic system which will be the foundation for the peace which follows it.

Even so, the decentralization of defence industries has been given only minor consideration in our protective programme, and there is no public sentiment on the matter whatever. The War Department enforces certain restrictive rules governing the placement of new defence factories, and where new building is necessary, the projects are engineered with air defence in mind. But these are palliatives rather than a general corrective. Such decentralization as has occurred during the past year has been more often the result of social and economic pressures—the desire to spread defence spending over areas where employment is lagging—than of a studied policy of protection. Our American tradition of free enterprise, our American system of mass production, and the local and sectional currents of our national

¹ General J. F. C. Fuller's *On Future Warfare*.

THE NATURE OF MECHANIZED POWER

politics all run counter to any such policy. It is too late to do very much about it except to take cognizance of the position, and examine in their true light any such fantastic assumptions about our national security as the one advanced by the Chicago mail-order general who argues that we are one hundred times removed from the slightest danger of invasion because the Germans cannot cross even the twenty-one miles of water along the Dover Strait.

Invasion, Major Seversky has remarked, is a Stone Age concept and the term applies in more ways than he intended it. When the last word is said, there is no security for the United States, nor is there any protection for its citizens, except as our arms develop such strength as will guarantee that any war we might enter we will certainly win. We do not have to be invaded to be beaten. Our territory need not be occupied to encompass our ruin. The destruction of the military means by which we could enforce our will at the peace would be tantamount to defeat. A drawn war would be a victory for the forces of chaos and of revolution, not for the kind of law and order in which we believe.

The aim of a military defence of the United States is not alone to maintain an unconquered position in the world but to safeguard the greatest number of those things which go to make up a gracious and reasonable society. Those who keep their sights trained on these objects are not apt to draw courage from the hardy pioneer spirits among us who stake their faith in the nation's unconquerable will, and who continue to insist that if the worst comes, we can break up into guerrilla bands and remain a free people until in the appropriate hour we can emulate the Spaniards under Pelayo and stage our own Covadonga. The realist will continue to believe that the best of all possible worlds has blessings beyond the privilege of living in a cave somewhere within 1,500 miles of the Mississippi.

All history rejects the favourite theme of the isolationist that because the attack on the Americas is such an extraordinarily complex problem, the Axis nations will not try it. If wars were made only when the path of conquest was smooth and obvious, and its end could be easily foreseen, then the record of the past would accent only the triumphant march of militarism and the unexceptionable success of aggression.

MACHINES AND MEN

During the Napoleonic period, when England was menaced by invasion, Admiral Nelson was asked to survey the problem of the island's defence. He reported that he could pronounce the invasion impracticable, and then he added: 'But I think it perfectly correct to prepare against the acts of a mad government.'

To-day there are other mad governments loose upon the earth, and only a fool would say in his heart that he and his country are safe.

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